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Vol. LXXII Part 1

22365
IARI

JANUARY 1947

PAGE
The Secretary's Page 1
Wisley in January 2
Dawyck. By W. Balfour Gourlay, M.C., M.A., M.B., B.Ch. *Illustrated* 5
Plants and Experiences in the Eastern Mediterranean. By P. H. Davis. *Illustrated* 13
Charm Chrysanthemums. By A. P. Balfour. *Illustrated* 17
The Old Carnations and Pinks By Grace Gladwin, F.R.H.S. *Illustrated* 19
Gardening in Lima. By Christopher Sandeman 23
Notes from Fellows :
  Ginkgo biloba. By Lord Aberconway 32
  Arbutus Menziesii. By Charles Eley. *Illustrated* 32
  A Further Note on the Brothers William and Thomas Lobb. By Rt. Rev. the Lord Bishop of Truro . 33
  Allium tricoccum. By W. T. Stearn 36
Wisley Trials, 1946 : Broad Beans, Early Peas . . 36
Plants to which Awards have been made in 1946 . 39
Book Reviews 44
Proceedings, 1946 . . . . . . i-viii

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JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

Vol. LXXII Part 2

FEBRUARY 1947

PAGE
The Secretary's Page 45
Wisley in February 47
When the Amateur should pick and how he should store Apples and Pears. By Dr. Cyril West . 49
Camellias and their Culture. By Francis Hanger. *Illustrated* 59
Some Wild Plants of Palestine and the Problems of introducing them as Garden Plants. By Dr. Elisabeth Boyko. *Illustrated* 68
The French Fruit Garden at Foot's Cray Place. By N. B. Bagenal. *Illustrated* 71
Notes from Fellows:
  Cypripedium hirsutissimum as epiphyte. By C. R. Stonor 73
  Old Carnations and Pinks. By Grace Gladwin . 74
Plants to which Awards have been made in 1946 . 75
Book Reviews 76
Proceedings . . . . ix–xxviii

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THE ROYAL HORTICULTURAL SOCIETY

A STUDY OF THE GENUS PAEONIA

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JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

Vol. LXXII Part 3

MARCH 1947

PAGE

The Secretary's Page 77
Wisley in March 79
" A Study of the Genus Paeonia " 81
Orchids for Amateurs. By E. Cooper. *Illustrated* 83
Continuous Cloche Gardening. By C. P. Quarrell, B.Sc. (Hort.). *Illustrated* 88
The Flowering Shrubs of Palestine. By Capt. Eric Hardy 100
The Horticultural Planting of the Imperial War Graves Commission in Northern Europe. By W. F. W. Harding, B.Sc. (Hort.). *Illustrated* . 104

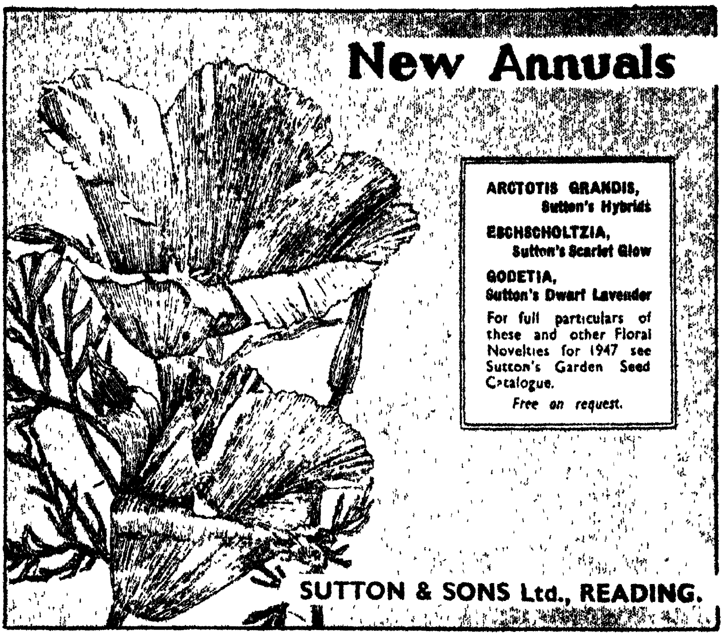
Notes from Fellows—

Plant Hunting in China. By E. H. M. Cox. *Illustrated* 110
Abeliophyllum distichum. By Dr. M. Amsler *Illustrated* 110
Embothrium coccineum Forster. By Dr. Ch. H. Andreas 111

Wisley Trials 1946—

Dahlias 113
Spring Sown Onions 119
Plants to which Awards have been made in 1946 . 120
Book Notes 124
Proceedings . . . . . . xxix-xxxii

VINCENT SQUARE, LONDON, S.W.1.



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JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

Vol. LXXII Part 4

APRIL 1947

PAGE

The Secretary's Page 125

Wisley in April 127

Plant Collecting in South-Eastern Tibet. By George Taylor, D.Sc. Part I. *Illustrated* . . . 130

Intensive Methods of Apple and Pear Growing. By A. Beryl Beakbane. *Illustrated* 145

The Leaf-Rolling Rose Sawfly, *Blennocampa pusilla* Klug. By G. Fox Wilson 155

Notes from Fellows 159

Plants to which Awards have been made in 1946 . 160

Proceedings: Annual General Meeting . . xxxiii

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Vol. LXXII Part 5

MAY 1947

PAGE
The Secretary's Page 161
Wisley in May 163
Plant Collecting in South-Eastern Tibet. By George Taylor, D.Sc. Part II. *Illustrated* . . . 166
Tresco under Three Reigns. By the Right Rev. J. W. Hunkin, D.D., Bishop of Truro. Part I. *Illustrated* 177
Award of Garden Merit—LXXIX. *Illustrated* . 191
Bud and Flower Dropping in Lupins. By L. G. G. Warne 193
Short Nights: An Unappreciated Hindrance to Maize Cultivation in England. By B. C. Sharman, B.Sc., Ph.D. 195
Wisley Trials, 1946:
  Early Flowering Chrysanthemums . . . 202
  Border Carnations 206
  Garden Pinks 207
  Eschscholzias 209
  Spinach 210
Plants to which Awards have been made in 1946 . 211
Book Reviews 211

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Vol. LXXII Part 6

JUNE 1947

PAGE
The Secretary's Page 213
Wisley in June 214
Obituary Notice—Lt.-Col. F. R. Durham, C.B.E., M.C. *Illustrated* 217
Tresco under Three Reigns. By the Right Rev. J. W. Hunkin, D.D., Bishop of Truro. Part II. *Illustrated* 221
The Conifers at Mount Usher, Co. Wicklow. By Commander F. Gilliland. *Illustrated* 237
The Secretion of Farina by Species of Primula. By Walter C. Blasdale, Ph.D. *Illustrated* 240
John Abercrombie (1726–1806). By F. M. G. Cardew 245
Notes from Fellows—Cistuses and Frost 248
Two Noteworthy Salvias . 249
Awards after Trial at Wisley, 1946:
Delphiniums 251
Narcissi 252
Rhododendrons 254
Sweet Peas 255
Book Notes 256
Proceedings xlix

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Vol. LXXII Part 7

JULY 1947

PAGE

The Secretary's Page 257

Wisley in July 259

The History of Anemone japonica. By E. A. Bowles and W. T. Stearn. Part I. *Illustrated* . 261

Some Preliminary Investigations on the Growing of Walnuts in England (1925–46). By E. M. Glenn, R. G. Hatton, and A. W. Witt. *Illustrated* 269

Electricity in the Garden. By C. A. Cameron-Brown 274

Dr. Thornton and the "New Illustration" 1799–1807. By F. M. G. Cardew 281

Notes from Fellows:
  The Lost Scent of Mimulus moschatus. By W. Balfour Gourlay 285
  Epimedium pubigerum. By A. T. Johnson . . 287
  Ginkgo biloba L. By Edward Cahen . . . 288

Awards to Plants in 1947 288

Book Notes 291

Proceedings liii

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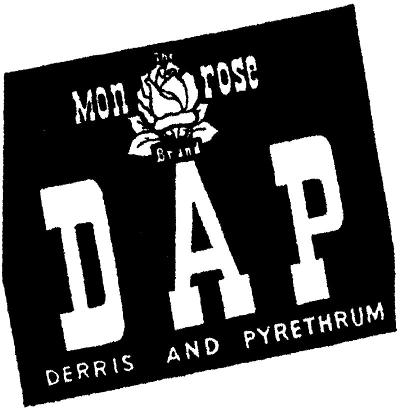

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Vol. LXXII Part 8

AUGUST 1947

PAGE

The Secretary's Page 293

Wisley in August 295

The History of Anemone japonica. By E. A. Bowles and W. T. Stearn. Part II. *Illustrated* . . 297

Meconopsis from the vicinity of Lhasa. By George Taylor, D.Sc. *Illustrated* 309

Masters Memorial Lectures, 1947: Growth Regulating Substances in Horticulture. By T. Swarbrick, M.Sc., Ph.D. Part I 313

Cymbidiums. By B. Hills. *Illustrated* . . 327

Notes from Fellows:
  Some Small-growing Kniphofias. *Illustrated* . 334
  Magnolia Veitchii. *Illustrated* 335

Book Notes 336

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JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

Vol. LXXII Part 9

SEPTEMBER 1947

PAGE
The Secretary's Page 337
Wisley in September 339
Masters Memorial Lectures, 1947: Growth Regulating Substances in Horticulture. Part II. By Dr. T. Swarbrick, M.Sc., Ph.D. 342
The Genus Viburnum. By A. Burkwood. *Illustrated* 360
The Chrysanthemum Eelworm and its Control. By G. Fox Wilson. *Illustrated* 364
Injury to Aster Seedlings by the Leaf Curling Plum Aphis. By I. Thomas. *Illustrated* 369
Notes from Fellows—
  Cornus Kousa var. chinensis. By Col. F. C. Stern. *Illustrated* 371
  Rosa Ecae. By R. C. Jenkinson. *Illustrated* . 371
  Agaves at La Mortola. By Dorothy Hanbury. *Illustrated* 372
  The Scent of Mimulus moschatus. By H. N. Ridley, F.R.S. 373
Awards to Plants in 1947 373
Book Notes 375
Proceedings lxi

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JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

Vol. LXXII

Part 10

OCTOBER 1947

PAGE

The Secretary's Page 377

Wisley in October 379

Uncommon American Shrubs and Plants. By Mrs. J. Norman Henry. *Illustrated* 382

New and Noteworthy Plants :

Rhododendron yakusimanum. By Dr. J. Macqueen Cowan and F. Hanger. *Illustrated* . 391

The Tibetan form of Paeonia lutea. By Col. F. C. Stern. *Illustrated* 394

Some Experiments with Hortomone A. By Dr. S. C. Bradford 395

The Award of Garden Merit—LXXX. *Illustrated* . 399

Notes from Fellows :

Veronica Derwentia. By G. W. Robinson. . 400

Geranium Wallichianum Buxton's Variety. By A. T. Johnson 401

Awards to Plants in 1947 402

Book Notes 409

Proceedings lxv

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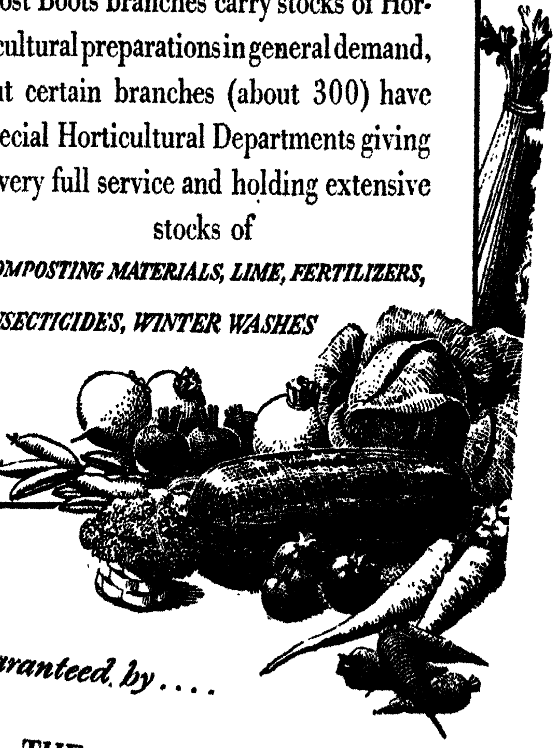

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JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

Vol. LXXII Part 11

NOVEMBER 1947

PAGE
The Secretary's Page 413
Wisley in November 415
Choice Shrubs. By Michael Haworth-Booth. *Illustrated* 418
The Spring-Flowering Buddleias. By A. D. Cotton, F.L.S., V.M.H. *Illustrated* 427
Fuchsias. By W. P. Wood. *Illustrated* . . 438
The Maidenhair Tree. By H. Prideaux-Brune . 446
Notes from Fellows—
  Dr. Thornton's Royal Botanical Lottery . . 450
  Eucalyptus in England 453
Plants to which Awards have been made in 1947 . 454
Book Notes 456
Proceedings lxxvii

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JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

Vol. LXXII Part 12

DECEMBER 1947

PAGE
The Secretary's Page 461
Wisley in December 467
The Gardener looks at his Flower Vases. By John Adams. *Illustrated* 469
Pitfalls of the Amateur Fruit Grower. By Raymond Bush 473
Storm over Wisley. *Illustrated* 483
Notes from Fellows:
  The Centenary of three Introductions of Distinction. By Right Rev. J. W. Hunkin, D.D., Bishop of Truro. *Illustrated* 485
  K. Wada San. By G. Anley 486
  Two Colours. By P. H. Davis 487
Plants to which Awards have been made in 1947 . 487
Book Notes 489
Proceedings lxxxv
Index lxxxvi

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VINCENT SQUARE, LONDON, S.W.1

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Vol. LXXII Part 1

January 1947

THE SECRETARY'S PAGE

Subscriptions, 1947.—The Secretary desires to remind all Fellows and Associates that their subscriptions to the Society fall due on January 1, 1947. It would help the office staff to deal with the extra work entailed in the distribution of annual tickets if remittances were sent to this office as early as possible in the New Year.

Annual Meeting.—The Annual Meeting to receive the Report of the Council for 1946 and a statement of accounts for that year will be held at 3 P.M. on Tuesday, February 18, in the Lecture Room of the New Hall; there will also be a Show on that and the following day.

Wisley Gardens.—The attention of all Fellows is drawn to the fact that the Wisley Gardens will be closed on Sundays during the months of November to March, inclusive.

How to get to Wisley.—Fellows and Associates desiring to reach Wisley from London are reminded that the simplest way is now by the Green Line coach which leaves Upper Regent Street, off Oxford Circus, at 7, 27 and 47 minutes past the hour en route for Guildford. The conductor will stop the coach, on request, at the turning on the Portsmouth Road which leads to the Gardens. An alternative route is by train from Waterloo to Kingston and thence by the Guildford bus, No. 215, which leaves the bus station, about one minute's walk from Kingston railway station. For particulars with regard to the buses, inquiries should be made at the London Passenger Transport Board, 55 Broadway, London, S.W. 1 (*Tel.* Abbey 1234). For the times of trains from Waterloo, the current time-table should be consulted or inquiries made at Waterloo Station (*Tel.* Waterloo 5100).

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Society's two main activities, the Gardens at Wisley and the Shows at Vincent Square.

Journal Binding.—It has been arranged that Fellows' copies of the Journal may be bound in green cloth with gold lettering and crest at a cost of 8*s.* 6*d.* each volume. Parts for binding should be sent, with remittance, to Messrs. Mansell (Bookbinders) Ltd., 31 Cursitor Street, Chancery Lane, E.C. 4. Return postage 1*s.* should be included with remittance. The parts should not be sent to the Offices of the Society. It is necessary to point out that there are considerable delays in the Binding Industry at present and that Fellows may be without their copies for some months after they have dispatched them.

Publications.—" A Study of the Genus Paeonia " by Col. F. C. STERN was published on December 19th and copies are available price £3 3*s.* 0*d.*, postage and packing 1*s.* 6*d.*, overseas 5*s.* The paper bound copies of the Daffodil and Tulip, Lily, Rhododendron Year Books, 1946, are now available, but it is regretted that owing to binding delay, the cloth bound copies will not be available till later this month. Price 6*s.* paper, 7*s.* 6*d.* cloth, plus postage 6*d.* A few copies of the R.H.S. Diary are still available, price : In Pluviusin without pencil 3*s.* 1*d.* post free ; in morocco leather, with loop for pencil, 6*s.* 1½*d.* plus postage 6*s.* 4*d.* Refills for Crocodile cases 2*s.* 4*d.* post free.

The Society's Examinations.—Entrants for the Society's Examinations in Horticulture are again reminded that the closing dates for entry forms are as follows :—

General Examination and General Examination for Juniors.—Monday, January 20, 1947.

National Diploma in Horticulture (Preliminary and Final).—Saturday, February 1, 1947.

Examination for Teachers of School Gardening.—Wednesday, April 30, 1947.

Kindred Society's Shows.—We are informed by the Alpine Garden Society that their Shows this year will take place on April 22 and 23, and September 9 and 10, to which our Fellows' and Associates' tickets will admit. The Alpine Garden Society will also be holding competitions in conjunction with our Show on March 18 and 19.

WISLEY IN JANUARY

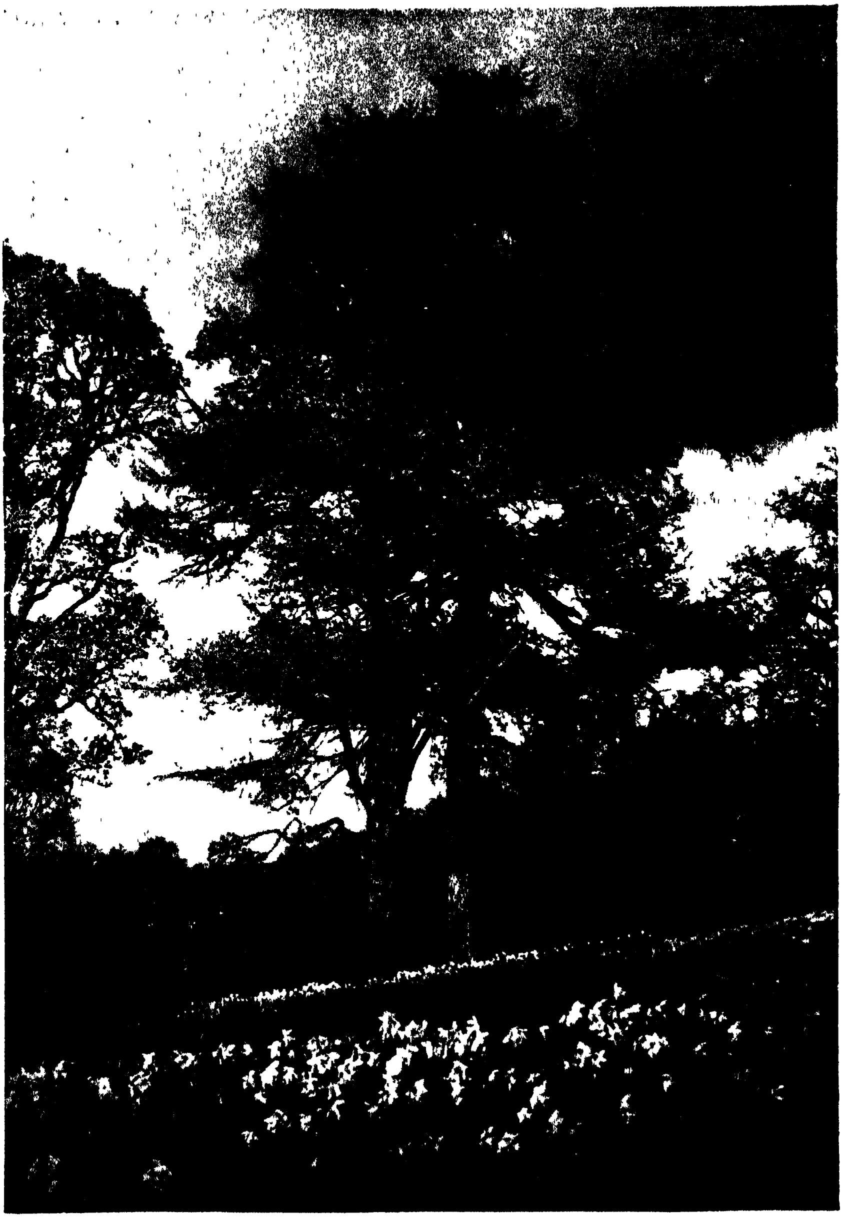
FLOWERING plants in the open are rare at this time of the year ; and the enjoyment of the Gardens depends upon the weather. A day of Winter sunshine will show not only those subjects upon which we rely for flowers at this dark season, but subjects which pass almost unnoticed when the full glory of Spring is with us.

Visitors to the Gardens will be able to see outside the gates, the picture in black and white presented by the birch trees on the common. In Seven Acres the orange yellow bark of the twigs of *Salix vitellina pendula* overhanging the pond intensifies in colour as the Winter deepens. Here too will be found the red shoots of *Cornus stolonifera,* and *C. sanguinea.*

Flowers in the open are scarce, but some of the best scented of all

Colour Photography by Fine-Art Engravers Ltd

FIG. 1 DELPHINIUMS AND SWEET PEAS
R.H.S. SHOW, VINCENT SQ., JULY 2ND., 1946

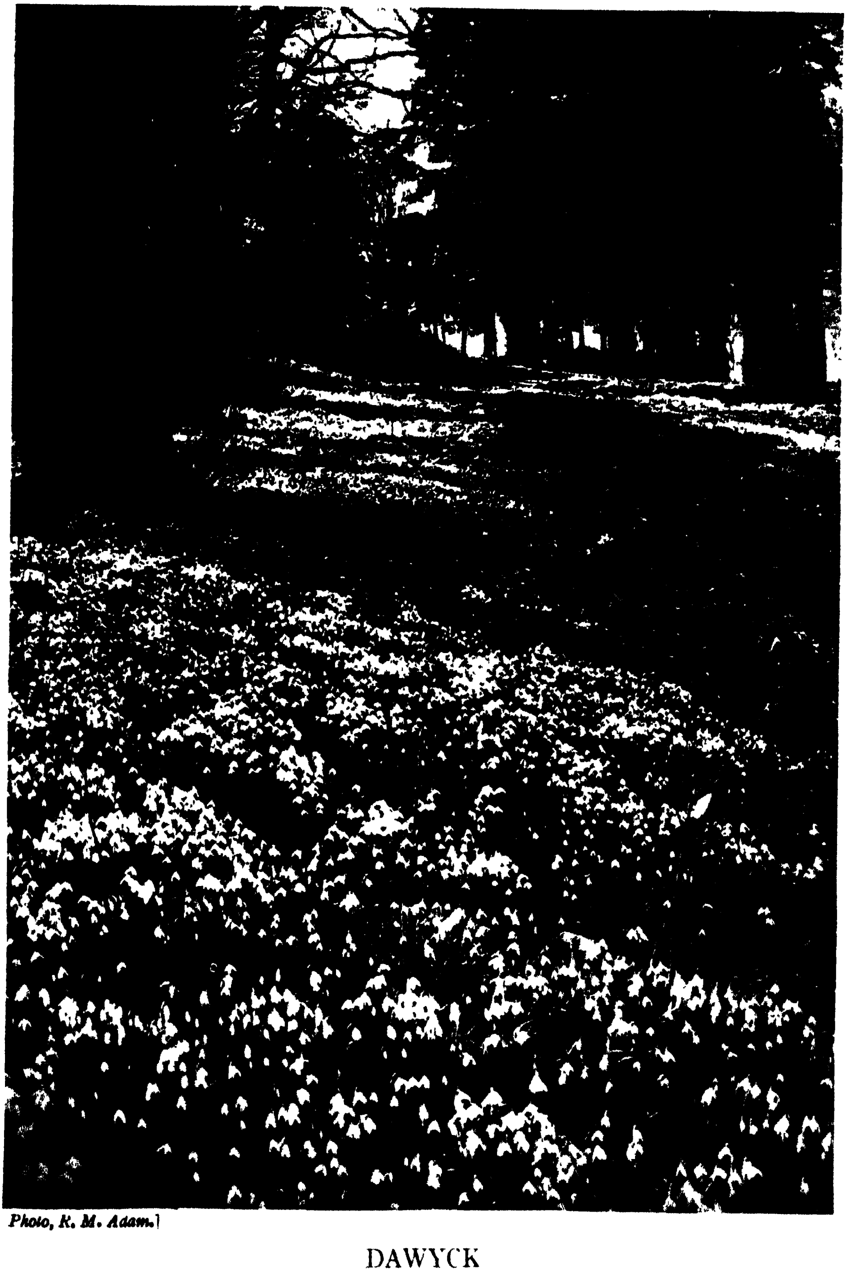


Photo, R. M. Adam.]

DAWYCK

FIG. 2.—ONE OF THE SURVIVING LARCHES PLANTED IN 1725 AND FIGURED BY LOUDON AS "THE TALL LARCH"

(See p. 7.)



Photo, R. M. Adam.]

DAWYCK

FIG. 3.—SNOWDROPS IN SYCAMORE WALK

(See p. 8.)

Colour Photograph by Adprint Ltd.

FIG. 4.—WISLEY GARDENS
THE POND IN SEVEN ACRES

ROYAL HORTICULTURAL SOCIETY

ESTABLISHED 1804. INCORPORATED 1809.

NOTICE IS HEREBY GIVEN that the ONE HUNDRED AND FORTY-THIRD ANNUAL MEETING of the Fellows of the Society will be held in the LECTURE ROOM, NEW HALL, GREYCOAT STREET, WESTMINSTER, on Tuesday, February 18, 1947, at 3 P.M. precisely, for the purpose of receiving the Report of the Council for the past year, and electing a President, Vice-Presidents, Treasurer, Three Members of Council, and Auditor for the ensuing year.

By Order of the Council,
C. V. L. LYCETT,
Secretary.

ROYAL HORTICULTURAL HALL,
VINCENT SQUARE, WESTMINSTER, S.W. 1.
January 31, 1947.

ANNUAL MEETING

To be held at 3 P.M., February 18, 1947

AGENDA

Minutes of the last Annual Meeting, held February 19, 1946.
Report of the Council.
President's Address.
Treasurer's Statement.
Election of President.
Election of Vice-Presidents.
Election of Three Members of Council.
Election of Treasurer.
Election of Auditor.
Presentation of the Victoria Medals of Honour.
Presentation of Associate of Honour Badges.
Presentation of the Veitch Memorial Medals.
Presentation of the Lawrence Medal.
Presentation of the Holford Medal.
Presentation of the Sander Medal.
Presentation of the George Moore Medal.
Presentation of the Williams Memorial Medals.
Presentation of the Reginald Cory Memorial Cup.

[P.T.O.

LIST OF NOMINATIONS

The following list of nominations of President, Vice-Presidents, Members of the Council and Officers for election is circulated in accordance with By-law 58:

	Proposed by	*Seconded by*
As President:		
Lord Aberconway, C.B.E., V.M.H.	Mr. E. A. Bowles.	Mr. R. D. Trotter.
As Vice-Presidents:		
General His Highness Maharaja Sir Joodha Shumshere Jung Bahadur Rana of Nepal, G.C.B., G.C.S.I., G.C.I.E.	Lord Aberconway.	The Duke of Devonshire.
Lieut.-General His Highness The Maharaja of Jammu and Kashmir, G.C.S.I., G.C.I.E., K.C.V.O.		
Field-Marshal The Rt. Hon. Jan C. Smuts, P.C., C.H., F.R.S., K.C.		
The Viscount Ullswater, G.C.B., P.C.		
Professor L. H. Bailey, LL.D., Litt.D.		
Mr. E. A. Bowles, M.A., F.L.S., F.R.E.S., V.M.H.		
Mr. Alister Clark.		
Mr. F. Cleveland Morgan.		
Sir Frederick Moore, M.A., D.Sc., F.L.S., V.M.H.		
Mr. B. Y. Morrison.		
Mr. C. T. Musgrave, V.M.H.		
Mr. C. G. A. Nix, V.M.H.		
Colonel The Hon. Sir Heaton Rhodes, K.C.V.O., K.B.E.		
Sir William Wright Smith, M.A., F.R.S., F.R.S.E., F.L.S., V.M.H.		
As Members of Council:		
Mr. George Monro, C.B.E., V.M.H.	Mr. T. Hay.	Dr. H. V. Taylor.
Colonel F. C. Stern, F.L.S., V.M.H.	Mr. F. A. Secrett.	Mr. G. W. Leak.
Mr. R. D. Trotter	The Hon. David Bowes-Lyon.	Sir Edward Salisbury.
As Treasurer:		
Mr. R. D. Trotter	The Hon. Lewis Palmer.	Mr. J. B. Stevenson.
As Auditor:		
Mr. F. G. Feather, F.C.A.	Dr. R. G. Hatton.	Mr. A. Cheal.

By Order of the Council,
C. V. L. LYCETT,
Secretary.

December 31, 1946.

our shrubs flower at this season, generally on leafless branches; here they are scattered throughout the Gardens, but planted with an evergreen background, in a position easily viewed from the windows of the house, they will brighten many dark days.

The best of our January flowering shrubs is the Chinese Witch Hazel, *Hamamelis mollis*, and the finest specimen will be found in the Award of Garden Merit collection, while others are in Seven Acres, and the Wild Garden. Here too the allied *H. japonica* will be found in bloom, towards the end of the month. Also in the Award Garden, a large shrub of *Viburnum fragrans* has been in flower since October, and every sunny day brings out a few of the pale pink sweetly *scented* blossoms, this display will continue into February. In Seven Acres and on the border near the Laboratory *Lonicera fragrantissima* will be producing its small but delightfully fragrant white flowers, while still retaining a few green leaves of the previous year.

The Heath Garden will have commenced another year of continual colour with *Erica carnea* and its varieties, in all shades of pink and white, and *E.* × *darleyensis*. While if the Winter is not too severe *E. lusitanica* and its hybrid *Veitchii* will present taller blocks of white amidst feathery fern-like foliage. Interspersed with these will be grey masses of dormant Ericas, and the faded rust-coloured spikes of the Cornish Heath.

The Winter sun seems to add colour to the many fine specimen Conifers both in front of the glasshouses and in the Pinetum, *Chamaecyparis Lawsoniana* varieties form stately columns of gold, grey and livid green, beside the variegated form of *C. nootkatensis* and *Cedrus atlantica glauca*, probably the best grey of all the Conifers.

Round the Laboratory walls, the Algerian *Iris unguicularis* produces its mauve flowers, generally preceded by its white form and followed by the narrow-leaved, violet-flowered variety, the only hardy herbaceous perennial to grace this season with flowers.

In the greenhouses the New Year has a better welcome. The Half Hardy house will show *Lithospermum rosmarinifolium* still producing a wealth of blue flowers about ¾-inch in diameter, and the yellow and orange Abutilons nearing the end of their display; while *Canarina campanulata* a semi-climber with orange brown bell-shaped flowers, *Calceolaria Pavonii* trained on the roof supports and *Narcissus dubius* a small white Tazetta from the South of France will be new additions to the floral display. The Peach house and Vinery will well repay attention from Fellows requiring guidance in the pruning and Winter treatment of these subjects.

In the Temperate house a cloud of yellow Acacia blossom from *Acacia Baileyana, longifolia* and *Drummondii* greet the visitor. Here also *Camellia japonica* var. 'White Swan' and many others in shades of pink and red lend colour to the scene. Growing in pots will be seen some of the newer hybrids between *Camellia saluenensis* and *japonica* with 'J. C. Williams' one of the most noticeable.

Pomaderris elliptica a neat growing shrub with light buff-yellow flowers practically hiding the leaves, should be in full flower. A young plant of *Jasminum polyanthum* trained on the roof will be opening its pink tinged buds to reveal white sweetly scented flowers, looking like a refined and lighter *J. officinalis.*

Among the permanent members planted in the beds, will be noted *Buddleia asiatica* more valued for its scent than the beauty of its small white flowers, borne in 6-inch panicles on the ends of the shoots which together with *Correa speciosa* var. *Harrisi* and *C. alba,* will be clothed with scattered red and white bells. Ericas also add to the display with *Erica ventricosa magnifica* and *E. canaliculata* both natives of Cape Province. Round the staging will be found a number of Winter flowering pot plants, including Cinerarias, *Primula obconica, Epacris* species, and Ericas.

One other house has flowers to show the visitor, the Alpine house, well worth the climb up through the Rock garden to reach it. Here *Iberis semperflorens,* a white Candytuft from the Mediterranean, never fails to flower in the shortest days of the year. *Cyclamen coum, C. ibericum* and var. *album,* produce their pink and white flowers and marbled foliage, in company with the neat cushions of the *Kabschia* section Saxifragas, each plant of which will be dotted with white, pink or yellow flowers as the month advances. An early snowdrop, *Galanthus rhizensis,* a native of Asia minor, and *Ranunculus calandrioides* with large white pink flushed flowers and glaucous foliage will also be in flower, also the unusual *Ribes laurifolium,* semi-evergreen with ovate dark-green leaves 3–4 inches long and racemes of greenish yellow blossoms.

Berried shrubs, a feature of previous months, are now few in number, *Skimmia japonica,* a dioecious shrub with sealing-wax scarlet berries on the females will be found on Battleston Hill, and *Cotoneaster rotundifolia* in the Award garden, the birds will have cleared almost all the others, and human agencies the holly berries from the Common.

ALTERATIONS AND IMPROVEMENTS IN THE GARDEN

Many visitors will be able to gain ideas from the great improvements and additions to the Gardens which are now taking place.

On Battleston Hill over 200 large Pines and Chestnuts have been grubbed, the ground double dug and laid out in beds to accommodate a magnificent collection of Rhododendron species, a trial of deciduous Azaleas of the Ghent and mollis types, and a large representative group of Kurume Azaleas. It is hoped to construct a path joining this new work to the large-leafed Rhodo-species already planted in the dell beyond the public footpath.

The Wild garden has been cleared of a few of the older and commoner trees and replanted with fresh colonies of Primulas and *Lilium giganteum,* it is hoped in future years to increase the variety of the Primulas and add many more Lilies and Meconopsis. In places where the paths had become overgrown new paths have been made to allow a greater spread for choice specimens.

The Award of Merit garden has been replanted with many fresh subjects which have received the award in more recent years. A small rockery has been constructed at the end nearer the pond for rock plants and the smaller bulbous subjects, and a border for herbaceous plants which have received the Award.

DAWYCK

(The Home and Garden of the late Mr. F. R. S. Balfour, c.v.o., f.l.s., v.m.h.)

By W. Balfour Gourlay, M.C., M.A., M.B., B.Ch.

DAWYCK is situated on the South bank of the river Tweed in its upper reaches, some eight miles or so above the county town of Peebles. Here the neighbouring hills have the steep sides and rounded tops, so characteristic of those of that great mass, of Silurian formation, which forms the Scottish Southern Uplands. Glacial drift clothes their lower slopes, and the soil is quite, or almost, lime free.

Dawyck house stands a little over 600 feet above sea level; and, except where the steep-sided glen of the Scrape burn penetrates them, the hills rise steeply behind the house to 2,347 feet at the summit of Scrape Hill. The area of ornamental planting (usually known in Scotland as " The Policies ") lies for the most part between the 600 and 850 foot levels, while hard wood, and above them, Conifer plantations range from 700 to about 1,300 feet, with grouse moor beyond that.

Upper Tweeddale lies in one of the coldest regions of Scotland. A degree or two of frost may occur in almost any month throughout the year, while the mercury occasionally falls in winter to zero F. or near it. More than 40° of frost was experienced during the very exceptional cold spell of January 3–6, 1941, which did so much damage to trees and shrubs in many parts of Great Britain.[1] While the average annual rainfall is about 36 inches, periods of drought in summer occasionally occur.

The Dawyck lands were first held by Veitches, an old County family whose name, originally Vache, gradually changed, through Veache, Vatch and Vaitch to Veitch. (The variants, Wach, Wauch and finally Waugh also occur.) Cows' heads still adorn the Veitch Coat of Arms.[2] Sir John Veitch of Dawyck sat in the Scottish Parliament as one of the representatives of the Shire, but in 1642 resigned the estate in favour of his son, also named John. This John Veitch was the last of the original race of Dawyck lairds, as it was from him that the estate was acquired in 1691 by Mr. James Naesmyth, a successful advocate.[3]

After being held by several generations of Naesmyths, the estate was purchased in 1897 by Mrs. Balfour, widow of Alexander Balfour originally of Leven in Fife and later a well-known Liverpool merchant and philanthropist and father of the late Mr. F. R. S. Balfour. Dawyck has a long and distinguished arboricultural record through Veitch, Naesmyth and Balfour times.

A portion of a former approach to the house is lined by ancient English Elms, poor trees and unsuited to the district but perhaps the oldest on the estate, and undoubtedly dating from the Veitch period. Two venerable Horse-chestnuts, in their time believed to be the oldest in Scotland, stood together near Dawyck house till the night of

December 17–18, 1932, when the larger tree was blown down in a gale. In its fall it destroyed the smaller one. Of them, Dr. JOHN WALKER, Professor of Natural History in Edinburgh University, wrote :—" The two trees on the lawn, which was formerly the garden, are perhaps the largest in North Britain, and probably the oldest, as they are known to be about 150 years old." [4] (Though his book was not published till 1812, the Professor died in 1803. That would suggest that the trees were planted by one of the Veitches about 1650.)

Among the older trees are an avenue of Limes extending from the house, in a north-easterly direction, across the park. A row of silver Firs (*Abies pectinata*), all of them over 100 feet high, tower above the tall Beech trees in Heron Wood. BALFOUR was of opinion that, with the Horse-chestnuts, these were all planted by the Veitches between 1660 and 1680.

After the estate passed into the hands of the Naesmyths, it was not long before great changes were seen there. ALEXANDER PENNECUIK, in his " description of Tweeddale," wrote of Dawyck in 1715 : " It is now in the hands of Sir JAMES NASMYTH of Posso, an eminent lawyer, who has rebuilt the house and garden and added some more ornamental planting for the beauty of the place. Here in an old orchard, did the *Herons* in my time build their *Nests*, upon some large *Pear-trees*, whereupon in the harvest time are to be seen much *fruit* growing and trouts and *eels* crawling down the body of these *trees*. These fish the herons take out of the river *Tweed* to their nests and this is the remarkable *Riddle* that they so much talk of ; to have *flesh*, *fish*, and *fruit*, at the same time upon *one tree*." [5]

The herons are still at Dawyck, but now nest in tall Beech trees in the Heron Wood, above the Beech Walk. The heronry dates back from long before Naesmyth times, as herons (for falconry) were supplied from Dawyck for the entertainment of KING JAMES IV (1488–1513).

On his death in 1720, Sir JAMES was followed by his son, also Sir JAMES NAESMYTH. This, the second baronet, was a noted botanist and pupil of LINNAEUS. He introduced to Dawyck many fine Conifers and other trees, as his grandson, Sir JOHN MURRAY NAESMYTH, the fourth baronet, did after him.

Opinions differ on the question of whether the Larch tree in Scotland was first grown at Dunkeld or at Dawyck. But the Edinburgh Physical Garden (which occupied part of the site where now stands the Waverley Railway Station, and which was a forerunner of the Royal Botanic Garden) has a prior, but usually forgotten, claim to this distinction.

In favour of Dunkeld, Professor WALKER mentions a Larch in the gardens there, and says of it : " This was one of the two first Larches that were planted in Scotland. They were sent down from London, by the DUKE OF ATHOL, in the year 1727, along with some Orange trees, and other greenhouse plants. They were kept with these for two or three years, in pots, in a greenhouse, as rare exotic trees. But when their hardy nature came to be known, they were planted out in the garden. This tree, that remains, has a fine appearance, notwithstanding the errors of its education."[6] It was from 1759 onwards, on the Athol estate, that the second and third DUKES OF ATHOLL grew Larches on a large scale, to the great advantage of forestry in Great Britain.

The old Larches at Dawyck were planted in the same decade as those at Dunkeld. Loudon, in 1838, mentions that there were nine of them, all planted in 1725. He gives figures of two of these, known respectively as the "crooked Larch" and the "tall Larch."[7] The latter is one of the four that survive to-day (Fig. 2). Photographs of this tree (and of several of its contemporaries) were taken during the life-time of Sir JOHN MURRAY NAESMYTH. The legend on the back of one of these photographs reads:

> "Larch west of the new approach in Forefield.
> Planted from seed raised by my grandfather, Sir James,
> on his return from Italy from the Tyrol A.D. 1725.
> Circumference at base—15 ft. 6 ins.
> do. at 3 ft. 11 ft.
> decaying alas!
> Photographed Oct. 1870.
> John Naesmyth, Dawyck"

(It was probably a large lower branch, long since removed, that was decaying.)

As long ago as 1683, Mr. JAMES SUTHERLAND, Intendant of the above-mentioned Edinburgh Physical Garden, published a catalogue of the plants therein contained. "Larix, the Larch-tree" occurs in his list.[8]

During the life of Sir JOHN MURRAY NAESMYTH (1803–1876), the great firm of nurserymen, James Veitch & Son of Exeter and later of Chelsea, was sending out men to California and the Far East to collect seeds of Conifers and other trees. Sir JOHN took full advantage of such expeditions. (N.B.—JOHN VEITCH was born at Jedburgh in Roxburghshire in 1752 and, as far as I know, was not directly related to the Veitches of Dawyck. In 1808 he rented land at Killerton, near Exeter. The firm of James Veitch & Son was formed by his son and grandson.)[9]

Among the older trees to be seen in the policies are fine examples of *Sequoia gigantea*, *Abies grandis*, *A. Nordmanniana*, *A. nobilis*, *A. magnifica*, *Picea sitchensis*, *P. orientalis*, *Tsuga heterophylla*, *T. canadensis*, *Libocedrus decurrens*, *Cupressus Lawsoniana*, *C. nootkatensis*, *Thuya plicata*, *Pinus Cembra*, *P. austriaca*, *P. ponderosa* and others. Of the many Douglas Firs, two in the Glen were grown from the first seed sent home by DOUGLAS himself, the taller one being about 120 feet high. An *Araucaria* tree, in Rhododendron Walk, grown from seed sent home by WILLIAM LOBB about 1844, was one of the casualties following the severe frost of January 1941. Scattered among the Conifers are old Yews and Holly trees and some fastigiate Oaks.

A fastigiate Beech, growing near one corner of the tennis lawn, is apparently unique. The upright habit of its branches is said to have been noted when growing, as a young tree, in a plantation. It was consequently replanted near Dawyck house for further inspection, and is now about 60 feet high. Some years ago it received the official designation of *Fagus sylvatica* var. *fastigiata* of Bean,[10] but is commonly known as the "Dawyck Beech" (Fig. 9).

"The Agriculturalists' Manual," by PETER LAWSON (published in Edinburgh in 1836), contains a section with articles on trees of various kinds. A copy of this work, presented by the author to Sir JOHN MURRAY NAESMYTH, came to light some years ago. Against its chapter headings Sir JOHN had added marginal notes, of considerable interest today. In these he claims to have been the first to plant *Pinus austriaca* and *P. ponderosa* in Scotland. Moreover his failures are also recorded. Thus: *P. Pinea.* "Many tried, but they won't grow here." *P. halepensis.* "Many tried but all died." *P. Sabiniana.* "Died here." *P. Lambertiana.* "Two planted, one died 1844." (None exist at Dawyck now.—W. B. G.). *Abies Smithiana* vel *Morinda* (*Picea Morinda*). "All have died here." *Cedrus Deodara.* "A great many tried here but with doubtful success." *Araucaria Cunninghamii.* "Planted but died." (My cousin F. R. S. BALFOUR, had similar results when he tried some of these species at a later date.)

Many paths lead through the grounds in various directions. From these, in early spring, can be seen great sheets of snowdrops growing in shady places. Their vast numbers would suggest that they had been introduced there many years ago (Fig. 3).

FREDERICK ROBERT STEPHEN BALFOUR was twenty-four years old when, in 1897, his mother purchased Dawyck from Sir MICHAEL NAESMYTH, the Sixth baronet. Subsequently, entering his late father's business, he spent four years in California in what was then a branch of the firm. In that mountainous country he saw growing in a wild state, many of the great Conifers that he had known so well in cultivation at Dawyck. This experience directed, along arboricultural lines, his natural bent for making collections. He worked in London after this, but also made a number of short business trips to the United States, on which occasions he usually found time to visit mountainous regions, from which he brought home seeds of trees and shrubs and even wild lifted plants, such as Brewer's Spruce (Fig. 8) and *Rhododendron Vaseyi*, by which the collections at Dawyck (and elsewhere) were enriched.

Still more valuable perhaps were his experiments in growing introduced trees, such as *Picea asperata*, *P. orientalis* and *Populus trichocarpa* under forest conditions. This Poplar grows faster than any other tree at Dawyck, where it was first planted in quantity in 1912. When grown with other trees, it soon outgrows the latter and is apt to be broken by the wind on attaining a height of 80 feet or so. Trees felled in *trichocarpa* plantations are already proving their value in the match making industry. A two acre plantation of *Picea orientalis*, twenty years old, is showing great promise.

BALFOUR took full advantage of the work, in the Far East, of such collectors as WILSON, FORREST and KINGDON WARD, and endeavoured to make as complete a collection as possible of all trees and shrubs of horticultural merit likely to grow under local soil and climatic conditions. In their arrangement, the mind of the collector is evident, as here and there one finds, grouped together, various species of Larch, Spruce, Maple, etc., though the more general arrangement was maintained when replacing losses in areas of Naesmyth planting.

Daffodils, of many kinds, planted by BALFOUR in wide drifts in the grass, are among the chief glories of Dawyck in Spring (Fig. 5).

In 1920 Mrs. ALEXANDER BALFOUR purchased a house in Edinburgh and left her beloved Dawyck to her eldest surviving son, FREDERICK, or FRED BALFOUR as he was known by his very many friends and relations.

It was some year previously that BALFOUR first became interested in the growing of Rhododendrons, and was much indebted, in the early years of his collection, to the generosity of Professor ISAAC BAILEY BALFOUR of Edinburgh, and of Professor CHARLES SPRAGUE SARGENT (then Director of the Arnold Arboretum, near Boston, U.S.A.)—both long since departed.

Some forty years ago, the only Rhododendrons at Dawyck were those dating from Naesmyth times, and occurred as large clumps of *Rhododendron ponticum* with some *R. Caucasicum* × *ponticum* hybrids and very old specimens of *R. maximum* and *R. catawbiense*. Recently Dr. J. M. COWAN, of the Royal Botanic Garden in Edinburgh, has enumerated more than 250 different kinds at Dawyck.

I noted that when *R. ponticum* veterans were removed to make room for more recent introductions, the newly vacant areas were soon green with innumerable Foxglove seedlings, perhaps a hundred or more to the square yard. It was evident that the seed must have lain for years in the soil, patiently awaiting favourable conditions for germination.

BALFOUR was an original member of the Rhododendron Society from its formation in 1915 and made occasional contributions to its literature, including an unpublished paper, entitled " Rhododendron Species in a Cold Situation." (The latter was to have been read at a Rhododendron Society Conference, which however, was cancelled owing to the outbreak of the war.) It is with the aid of data derived from these papers, added to and brought up to date by Dr. COWAN, that the following notes were largely compiled.

During the first decade of the century BALFOUR paid a visit to the Arnold Arboretum, and a little later, by Professor SARGENT'S generosity, became " the lucky possessor " of examples of all the Chinese Rhododendrons raised from seed collected by E. H. WILSON in Western Hupeh and Szechuan in 1907 and 1908 and of some Japanese Cherries, including *Prunus Sargentii.*

These and many other Rhododendrons, both species and hybrids, now flourish at Dawyck in the shelter of Scrape Glen, with its lime-free soil and abundant rainfall. Shade, where required, is supplied by occasional small trees, such as oriental Cherries or species of *Sorbus.* (Some were recently figured in the " Botanical Magazine.") *Lilium* *giganteum* (Fig. 6) standing erect and imposing in the more open beds, and here and there a bush of *Kalmia* or *Enkianthus* add a note of variety.

Rhododendrons that flourish are mainly among the 300 or so of the more robust species, graded " A " or " B " in the Year Book of the Rhododendron Association ; but there is none the less a surprising number among those that are graded " C."

Flowers on Rhododendrons at Dawyck appear, in most species, some three weeks later than those in Southern English counties and the plants do not reach the flowering stage until they are considerably older and larger than those in more favoured regions.

Among those that flower freely every year, are eight or nine species from the Himalayas. *R. fulgens* produces a fine show of flowers in early March and, though these are often destroyed by frost, its growth buds are never injured. *R. Hodgsonii* and *R. Wightii* are quite hardy and have never suffered damage. The latter flowers every year. The flowers of *R. Thomsonii* and of *R. campylocarpum* are frequently destroyed and both are liable to bark splitting after late spring frosts ; but the hybrids of these species seldom fail to produce a great profusion of flower. *R. Falconeri* survives but makes little growth. *R. arboreum* cannot endure the winter.

The American Azaleas are well represented at Dawyck by plants collected by BALFOUR himself in the Rockies, Selkirks and Coast Range Mountains. *R. Vaseyi* is the most reliable of these. The " Ghent " Azaleas flower well, as do the species *R. quinquefolium* and *R. reticulatum* which are both suited to cold regions ; but among many of the Japanese Azaleas, particularly those of the *obtusum* group, there have been more casualties than survivors.

The small leafed Alpine species, though they can of course be grown in any high and cold situation, and some flower freely enough, have on the whole not done well in the densely wooded north-facing glen at Dawyck. It was, however, from Dawyck that BALFOUR sent the charming yellow-flowered *R. Sargentianum* which was figured in the Botanical Magazine (Tab. 8871) in 1920. Of species from China, there are many at Dawyck. *R. Souliei* (Fig. 7), with its apple blossom pink and white flowers, which is seen to best advantage in a cold climate, seldom fails to make a good show ; and *R. vernicosum* is a particularly satisfactory plant. For *R. fictolacteum* and its various forms, there can be nothing but praise. At Dawyck there is a bank covered with large plants which flower freely year by year, though *R. insigne*, unlike *R. Delavayi* in the same series, is of cast iron hardiness and is as beautiful in foliage as it is in flower.

Of the Fortunei group, *R. oreodoxa* is perhaps the most satisfactory, but *R. planetum* does almost as well. Though *R. discolor* flowers rather shyly, it is not so with its hybrids, which blossom profusely. Many of the *Sanguineum* and *Haematodes* group are first class and *R. neriiflorum* and several of its hybrids are among the most attractive plants in the garden. *R. longisquamatum* has flowered regularly for many years.

The *Taliense* series, though it embraces many undistinguished members, deserves special mention for its race of hardy species. At Dawyck the series has proved a reliable reservoir of plants which can be grown successfully in a cold place. *R. aganniphum*, *R. flavorufum*, *R. Balfourianum* and *R. Clementinae* are all vigorous in growth. In 1937 *R. inopinum* was one of the best Rhododendrons in the garden, well clothed with trusses of refined dark cream coloured flowers. *R. Wiltonii* never fails to flower. *R. Burcavii*, with leathery foliage and thick rust-red tomentum, is another plant well worth growing; and at Dawyck a number of plants of *R. Weldianum* will be found, of which it may be said that its rarity is perhaps its chief distinction.

The *Lacteum* series too, enjoys the Dawyck climate. *R. lacteum* itself grows strongly and its foliage is never injured, though the flowers are often cut by frost. It is vigorous and not considered a difficult plant at Dawyck. *R. Griersonianum* is too tender to endure the climate; some of the hybrids, however, are excellent. *R. Azor* (*R. Griersonianum* × *R. discolor*) and *R. Griersonianum* × *R. maximum* were, in 1938, for some days, the showiest shrubs in the garden. Many of the *Triflorum* and *Heliolepis* series flourish, though unfortunately *R. Augustinii* proves more liable to frost injury than many others.

In October the beds are covered with about a foot of bracken. This nourishes the plants, blankets the top roots from frost in winter and reduces evaporation in Summer, and also prevents the growth of troublesome weeds.

BALFOUR's interest in National History was by no means confined to trees and shrubs, as he had a considerable knowledge of our British birds, and kept in an aviary a variety of rare and beautiful pheasants; while, on the pond, ducks and geese from various parts of the earth were an unfailing source of pleasure to himself and his friends, till war economy led to their dispersal.

A herd of Japanese deer, descendants of some imported by BALFOUR from Japan, have long been maintained in a large enclosure limited by a ten foot fence. Unfortunately a few of these creatures escaped into the open woodland during the first World War and their descendants have increased alarmingly during the last war period, and have recently invaded the Policies areas whose fencing after enforced wartime neglect, no longer exclude them efficiently. Many valuable young trees have been killed or damaged by the deer which destroy the bark with their horns, or when deep snow covers their usual food, tear it off with their teeth, to reach the vital tissues beneath. At Dawyck, Hollies, Rowans, and Oak saplings are liable to such attacks.

As regards diet, the deer show marked preferences for certain plants. *Rhododendron cinnabarinum* requires special protection against them; and they browse on the leaves of Yew trees with impunity though these are so poisonous to cattle. Deer have exterminated *Xerophyllum tenax*, "Indian Squaw Grass"—a handsome liliaceous herb from N.W. America. I happened to be with BALFOUR when he collected it. Other plants dug up and brought home on that occasion were *Lysichiton americanum*, a large leaved aroid which grows in bogs, and *Aspidium munitum*, a handsome fern.

The aroid still thrives at Dawyck and the fern is tending to become naturalized near the Scrape burn. It was on this trip that, after a vain search for cones or seeds under a tall Pine tree, my cousin surprised me by taking a catapult from his pocket. After a few practice shots, he succeeded in bringing down a cone full of ripe seed.

Mr. ALASTAIR NORMAN BALFOUR, the new laird since his father's death on February 2, 1945, is taking active steps to reduce the deer population and prevent them, by new fencing, from entering the area of ornamental planting.

Mr. F. R. S. BALFOUR was a member of the Council of the Royal Horticultural Society during the years 1920–1924 and a member of its Scientific Committee from 1915 until his death last year. In 1927 he received the Society's Victoria Medal of Honour for his " Active part in Forestry and Arboriculture for many years past." He was one of the original members of the Roads Beautifying Association and was latterly Chairman of their Technical sub-Committee. For twenty-two years he was a member of the Windsor Parks Consultative Committee. During this period he wrote a number of papers on arboricultural subjects such as " The Planting and After Care of Roadside Trees," which was read before the Institution of Municipal and County Engineers at the Public Health Congress of 1934 (Quart. Journ. of Forestry, July, 1935). He became an authority on the lives of the Perthshire arboricultural collectors, DAVID DOUGLAS (R.H.S. JOURN., Vol. LXVII, parts 4 and 5) and ARCHIBALD MENZIES (Proceedings of the Linn. Soc. of London 156th session, 1943–4, p. 170).

A. N. BALFOUR, only son of F. R. S. BALFOUR, was born on March 20, 1909. Recently demobilized, he now lives at Dawyck where he already takes a great and very practical interest in the forestry work on the estate.

An illustrated catalogue, by Mr. A. BRUCE JACKSON, with detailed descriptive list of trees and shrubs at Dawyck and a map, is in course of preparation.

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PLANTS AND EXPERIENCES IN THE EASTERN MEDITERRANEAN

By P. H. Davis.

(*Based on a Lecture given to the Society on* September 24; Dr. P. L. GIUSEPPI *in the Chair.*)

IN the Egyptian Desert there is more than sand and occasional pyramids. Although rain may fall three times a year, or not at all, yet there is considerable vegetation in a land where the necessities are reduced to the minimum. Walking in the keen spring air over the undulating flint hills of the Eastern Desert, I have found apparent coils of grey chromium—the leaves of a peculiar bulb, *Pancratium Sickenbergeri.* With the coming of summer this eccentric foliage vanishes; then, in September, before any rain has fallen, the bulb sends up its beautiful white-and-green trumpets, heavily fragrant, at a season when no other plant can bloom. In the spring, in a favourable year—and these are the exception—*Erodium arborescens* blooms in the run-offs of the gravel plateaux, its woody base and entire thick leaves topped by large carmine flowers with a black centre (Fig. 13). An unexpected tuberous root helps to tide the plant over prolonged drought.

Egypt, I must admit, is not an ideal source for garden plants. The regions where a steppe climate prevails are a far happier hunting ground, and one which has given us many of the finest plants which grace our gardens to-day. The steppes of Transjordan are an amazing sight in a showery spring. During my visit, so lush was the herbage that the weekly train to Amman was stopped on steep gradients by sap from the crushed flowers that had grown over the line since the previous week. Every few yards the guard would descend and scatter sand on the rails. I would take advantage of the halt to gather maroon Irises (*I. nigricans*) till the train was able to grip the line and climb a little further. Whether sleeping in a deserted tomb at Petra, or staying with the Arab Legion—when up-to-the-elbow feasts were the order of the day—spring in Transjordan was an immensely exciting experience.

A steppe climate also covers the greater part of Turkey. the Syrian Desert and Persia. The cold is often intense, and, though the winters may be wet, humidity is very low in the summer and drought uninterrupted for six months. In such a climate, *Dionysia curviflora* clings to the cliffs of S. Persia, its densely imbricated hummocks many decades old and in spring covered with stemless Birds-Eye Primroses of a particularly celestial pink.

Turkey, beyond all other countries in the Near East, holds treasure for our gardens. Botanically little explored, and almost unexploited horticulturally, its mountains of varied geology are full of many gorgeous plants, of which *Omphalodes Luciliae* is one of the few which have come to us. Its platters of powder-blue sprayed delicately above the oval glaucous leaves are the glory of all who possess them, the envy of those who do not. On the limestone rocks of Caria I have seen it sharing its home with *Galium aretioides*, a Woodruff that resembles a high alpine Androsace. Growing on the same mountain, *Linum aretioides* is the most to be desired in a genus famous for its beauties (Fig. 11); the wide soft yellow trumpets sit sessile on the mats of glaucous spathulate leaves. Many surprising things happen to genera in Turkey: Silenes, for instance, may be spiny, and when this happens they resemble Acantholimons covered with sessile flowers, long, glandular and crimson. But none of these gorgeous eccentricities is yet in our gardens.

In the Antilebanon—still in the steppe climate—*Hypericum nanum* forms golden mounds in the arid cliffs. It is accompanied by a new Ajuga of similar habit, whose ancient woolly cushions are thickly peppered with stemless bugles an inch long and of the brightest yellow with tigerish spots. Both these plants are so far growing well in cultivation, and, if our weeping weather does not prove too much for them, should cause a stir.

On the Eastern flank of the main Lebanon range we find a great park-like forest of *Juniperus excelsa*, interspersed with the thorny domes of *Onobrychis cornuta*, an attractive leguminous shrub widely distributed in the Levant, but not, I think previously in cultivation. It somewhat resembles *Erinacea Anthyllis* (*Erinacea pungens*) but the profuse pea-flowers are a deep wine-purple. It is abundant from 6,000–9,500 feet and should be a fine plant for the sunny scree.

As soon as we top the crest of the Lebanon and descend towards the West, the clouds roll up from the Mediterranean and the climate and vegetation change. Instead of Junipers we find the Cedars of Lebanon, the famous historical stand now reduced to a hundred trees which grow at 7,000 feet on an old terminal moraine. Below them lies the gorge of the Qadisha, and from its limestone cliffs hangs out a wonderful series of autocratic chasmophytes—*Trachelium tubulosum*, lavish in late summer with clusters of white; *Campanula trichopoda* with small pink-flushed bells on thread-fine stems; *Staehelina Lobelii*; *Hypericum cuneatum*; *H. rupestre*. . . . The list would run into scores, but I cannot leave these favoured rocks without reference to *Helichrysum Billardieri*, which I hope may soon begin to circulate in cultivation. It is in the same group as *H. virgineum*, but the snowy capitula are larger and open out quite flat above the ashen leaves. Owing to its position and the variety of habitats, the Qadisha gorge is the richest hunting-ground in the whole range.

It was in the Antilebanon that some Arabs gave me a nasty "turn," described in a previous R.H.S. JOURNAL; but the top of the Lebanon has also had its moments. Sir RALPH NEWMAN, with whom I was making the traverse, possessed a cheering bottle of liqueur. We put up for the night in the tents of a Christian shepherd. It was bitterly cold (for snow lies throughout the year on the N. slopes of the Lebanon), and we bethought ourselves of the drink. We were in time to see the shepherd's wife, with a child at each breast, swig the bottle to the dregs. Expecting to see her drop dead, or at least to observe the children fall from the breasts that offered such potent nourishment, we were surprised to see no immediate result. But drink made her bold; in the night she stole our blankets, and we were forced to abandon them, reference to the laws of hospitality having no effect upon the Amazon's heart.

The Mediterranean climate, like that of the steppe and desert, has a winter rainfall, but the precipitation is heavier and more regular; the summer, though dry, has a higher humidity which allows a more luxuriant vegetation to develop than in the adjacent steppes. In regions below 3,000 feet, the thorny Burnet, *Poterium spinosum*, dominates large areas, particularly on heavy terra-rossa soils associated with hard limestone, where it often replaces destroyed communities of oak and pine. Here we find the Mandrake (Fig. 15), but the Burnet garigue is particularly notable for its bulbous plants. *Iris palaestina*—a Juno like a small creamy *I. alata*—occurs locally, but, like most of its section, is a bad traveller; the fleshy roots are easily broken and the bulbs bruised. In the same community grow many of the larger Oncocyclus Irises, as bright and unexpected as the Brighton Pavilion. Of these, *I. nazarena* is one of the handsomest, the blooms being as much as 6 inches across, the standards pale lilac, the wide falls heavily spotted with brown. It seldom seeds, even in Palestine, but its long-stolonified habit makes propagation an easier matter than with most of its kind.

If Irises are the exciting highlight of the Levant, Fritillaries are certainly the glory (in a more modest way) of the Greek garigue. I have never seen two species growing together, the genus showing geographical replacement and pronounced endemism. The Cyclades have their private Fritillaries—the big *F. Tuntasia*, with flowers like ripe black grapes, that grows only on Kythnos; *F. Ehrhardii* on the steep shales of Andros. In the southern Peloponessus, I found *F. conica* showing triangular funnels of greenish gold, so that I hardly deserved to find another on Cape Matapan—*F. Davisii* Turrill (Fig. 14). At the end of February it was windy and wet on the Mani peninsula, and I was not feeling my best after walking for two days in almost incessant rain. Yet how quickly can tiredness disappear in the excitement of finding a new plant! That Fritillary, with ample bells of deep maroon, was enough to cheer me up for the rest of the weary way to the Matapan lighthouse. When, late at night, the weekly steamer arrived, the sea was rough and it was unable to approach as near the shore as it usually can. I imagined myself walking back to Gytheon which, even with a new Fritillary, was not an invigorating thought. But I need not have worried. I was placed on the shoulders of the largest fisherman on Matapan. Ploughing through the surf, he deposited me, fairly alarmed and rather damp, on the boat for Athens. And the Fritillary? It softly and silently vanished away.

On a sub-alpine plain in the White Mountains of Crete, *Tulipa Bakeri* shows its wide violet-pink, yellow-centred flowers (Fig. 10). It is from this diploid species that the autotriploid *T. saxatilis* is believed to have originated, the irregular grouping of the latter's chromosomes accounting for the fact that it is sterile. *T. Bakeri* has the advantage of being more free flowering than the other species, but I do not think it is quite as beautiful. In the Cypress woods above the plain grows *Fritillaria messanensis*—a slender and retiring species under whose name several plants have masqueraded in cultivation. There, too, bloom the snowy fragrant chalices of *Paeonia Clusii*; and *Cyclamen hederifolium subsp. creticum*, with flowers like elegant white shuttlecocks, sprouts in screes and holes in the rocks, the corm often far below the surface.

When the snows of the White Mountains melt, *Crocus heterochromos* covers the sopping earth with white flowers strikingly barred outside with violet. It is usually accompanied by *Chionodoxa cretica*, the island being the only European station for the genus. Above 6,000 feet *Anchusa caespitosa*, one of the finest alpines I have ever seen, stares back at the June skies with ultramarine white-centred flowers even larger than those of *A. italica*, but clustered in the centre of starfish-rosettes that sit flat upon the screes.

There is a mystery about the plant that goes by this name in cultivation. *A. caespitosa*, which I introduced from Crete in 1937, kept its character from cuttings and from seeds, but was not an easy plant to keep, being prone to damp off. During the war, the true plant seems to have disappeared from cultivation, and been replaced by a robust individual with 12 inch stems and smaller flowers—the '*A. caespitosa*' which received an A.M. in 1945. It has not proved possible to identify this with any Anchusa sp. known, so that one is led to suppose that it is either a hybrid of garden origin, or that a mutation has occurred under cultivation. Beautiful though the plant is, and easy to grow, it really should not continue existence under the name of *A. caespitosa* which needs re-introduction from Crete. A cytological investigation of the two plants might solve the problem of the usurper's origin.

Grazing is the curse of the Mediterranean. Nearly everywhere you go, herds of sheep and goats, following up deforestation caused by man, prevent the vegetation from reaching its natural climax and keep plant-life in a perpetual state of frustration. "Try, try again" is a maxim followed heroically by the Mediterranean flora. The spiny Burnet and *Euphorbia acanthothamnos* offer protection to many plants that would otherwise be grazed to death. *Campanula spathulata* subsp. *Spruneriana* twines through the wire-netting of Poterium, showing its violet stars just above the level of the thorns; *Tulipa cypria* lives in the same way, taking the hospitality offered as though it were the chief necessity of life (Fig. 12).

Inaccessible cliffs also afford an escape from goats. There, on high ledges and steps, plants survive which have long ago ceased to exist on the surrounding slopes. Many plants were doubtless saxatile from their very beginning, as appears to be the case when closely related species grow in similar rock-habitats. Other chasmophytes were made rather than born, and there is no doubt that intensive grazing is one of the causes of their origin and development. Saxatile plants offer a highly involved and fascinating study, and one on which little research has yet been done. They present problems which only infinite patience and longevity are likely to solve. For the time being we must leave them, gazing undisturbed from their cliffs above the wine-dark sea.

CHARM CHRYSANTHEMUMS

By A. P. Balfour.

CHARM Chrysanthemums may be used as a decorative subject, to be grown in pots, and will come into flower towards the end of October, remaining in flower from six to eight weeks.

Plants of this new race of Chrysanthemum are best raised from seed, and will come into full flower within about eight months from sowing time. When a few inches high the plants should be stopped, i.e. the growing point pinched out. No further stopping or training of any kind is required after that, and as the plants develop no staking or support of any kind is required. In fact, it will be found that even this stopping is often not required, the plants being found to break naturally. As growth proceeds secondary shoots are developed from the base, and eventually the plant becomes a mass of wiry shoots, each of which finally terminates in a group of flower buds. The plants finally develop into compact bushy plants some 3 feet across and 18 inches to 2 feet in height, with finely-cut fern-like foliage and carrying up to 1,000 flowers open at once when in full bloom. The flowers are on the whole pure singles, the size of a Michaelmas Daisy with a colour range from White to Blush Pink, Rose Pink, Bronze, Yellow, Red and Crimson, and many intermediate shades. They have the additional advantage of being sweetly scented, so scented that on sunny days one can smell them from outside the greenhouse. The main batch of plants will be found to come into flower from the end of October, continuing in flower up to the end of November or early December. Individual plants may even flower earlier or later than these dates. It is questionable whether any plant, of whatever genus, will produce in eight months from sowing from a single seed such an amazing flowering plant. Horticulturally, this race may be looked upon as one of the most valuable late-flowering annual plants, since the plants normally set and ripen seed within twelve months of sowing. The plant itself is perfectly hardy, but flowering as they do in November some covering must be given to protect the blooms from bad weather. A further variety is now under way, and it is hoped will soon be offered, which will flower from mid-September onwards to be grown entirely in the open border after planting out in May.

The ' Charm ' Chrysanthemum originated at SUTTON'S Seed Trial Grounds, at Slough. The initial step towards the new race was a sport arising out of SUTTON'S ' Cascade ' Chrysanthemums, and curiously enough from seed which happened to be grown in Kenya, Central Africa. The original seed of the ' Cascade ' had come direct from

China and is presumably a direct descendant of the wild Chrysanthemum of that country, *Chrysanthemum indicum*. Plants had been received from one or two other sources as well, and various forms hybridised to produce a greater range of colour and diversity of habit. The present strain has been made true to the compact bushy free-flowering habit by rigorous selection carried out over some years.

With regard to cultivation, that necessary to produce good pot plants of Japanese Chrysanthemums is all that is required. Although the principles of cultivation of the Chrysanthemum are very well known by this time, and have often been published, the Editor has asked me to give some of the actual details of our culture here, which produced the plants shown in the Royal Horticultural Society's Hall in London, in November this year.

Seed was sown in gentle heat in the first week in February, and as soon as large enough the plants were pricked out into small 60's, i.e. about the beginning of March. A fortnight later, they were potted on into 48's, and approximately at the end of May were potted into their final pots, 8-, 9- or 10-inch size, according to the size of plants desired. Smaller plants may also be obtained by using a still smaller pot for the final potting and sowing slightly later. Towards the end of May, as soon as the weather became favourable, after the final potting, the plants were placed on ashes outside, and grown in the open yard during the summer. An open situation must be chosen, but exposure to high winds should be avoided. Towards the end of September or early October, as the plants commenced to show flower buds, they were brought under the cover of a cool greenhouse. A completely cold house will be found to be quite sufficient to flower these plants well. Air must be given at all times and a light, airy atmosphere maintained. Should the weather become very bad a slight amount of heat in the pipes is an advantage in maintaining a buoyant atmosphere and avoiding mildew. On the other hand many plants now flowering at Slough at this date, November 12th, have had no heat whatever since bringing under cover in early October, and the plants are flowering perfectly and no trace of mildew to be found. Sterilised soil was used throughout, the sowing compost being a normal light compost used for sowing small seeds, namely :—

2 parts loam
1 part leaf mould
1 part sand

with about 1 ounce of lime to each bushel of soil.

The same soil was used for potting into small 60's, and for potting into 48's an extra part of loam was added. For the final potting the compost was made up of :

7 parts loam
2 parts leaf mould
1 part well-rotted farmyard manure
1 part coarse sand
½ part shingle (as the soil here tends to run together)

To each bushel of soil was added :

1½ ounces hoof and horn meal
1½ ounces superphosphate
¾ ounce sulphate of potash
1 ounce ground lime

A good fibrous, well-decayed turf from a well-managed old pasture is the best foundation for a potting compost for all plants.

As the Chrysanthemum is a gross feeder, to get the finest results, judicious feeding is necessary after the pots have become filled with roots. Here again the details of Chrysanthemum feeding are well known. In this case, feeding was started about four weeks after the final potting and carried out once a week, the material used being SUTTON's Simplex Fertiliser—a general fertiliser. Fish manure was also used as a change from time to time. Feeding was stopped about the middle to end of September.

In addition to feeding, careful watch must be kept for the usual Chrysanthemum pests. Spraying should be attended to regularly. These plants were sprayed mainly with nicotine and spraying started when the plants were quite small and carried on to the time they were brought into the houses. A look-out must be kept for mildew. Some growers spray with lime sulphur before bringing the plants into the houses. This has not been found necessary here, but the plants were dusted with sulphur dust as a preventive.

Fortunately, and probably owing to their being always produced from seed, these Chrysanthemums are very vigorous and healthy. In addition to being a most useful asset for the adornment of our homes and gardens, they should also prove a most valuable market subject.

THE OLD CARNATIONS AND PINKS

By Grace Gladwin, F.R.H.S.

THERE is a growing demand for the old Carnations and Pinks grown a hundred years or more ago, and many inquiries as to where these plants can be obtained have been received at Wisley and Kew. For a quarter of a century Mr. K. W. SANDERSON of Leeds, an authority on period garden plants, has been gathering information for his book, *Garden Plants 1500–1800*, and he has been the means of preserving for cultivation a number of these rare old plants, which include both Carnations and Pinks; these are the 'Painted Lady' Carnation, 'Fenbow' Clove, and an early Georgian 'Flame' Carnation, the former two are now at Wisley and Kew.

A recent discovery is a lovely 'Flame' Carnation of the early Georgian period which it is hoped will be propagated this year, also the Stuart Pinks 'White Shock,' 'Damask,' and, it is hoped, 'Old Man's Head,' all of which have been lost for more than a hundred years.

One would naturally assume, after taking into consideration the fact that both the Carnation and Pink can be produced in so many different forms, and with as much minute difference in the coloration of the flower, that the survival of a Pink or Carnation through the centuries would be almost impossible in its original form and colour, but after three hundred years of extensive propagation certain period florist Carnations and Pinks identical in form and colouring to those shown in the old flower books have survived from Elizabethan, Stuart and Georgian times into the twentieth century.

The Carnation *Dianthus Caryophyllus* was unknown in this country until the eleventh century A.D., when the Norman monks who followed in the wake of the Norman army introduced it into the monastic gardens of the South of England, where it was propagated and, in the course of time, was grown in most monastic and manor house gardens.

In the reign of Edward III there were three forms or varieties of the Carnation : crimson, white and pink, but only the single form was known, as the first double Carnations did not make their appearance in English gardens until the second half of the sixteenth century, in the reign of Queen Elizabeth, whose favourite flowers were the Rose and Carnation.

A unique Elizabethan painting, depicting a fruit, flower and vegetable stall with a lady standing by of the period 1560–80, is in Boling Hall Museum, Bradford. It is of the utmost value as a piece of evidence proving that our Elizabethan ancestors had advanced far in the propagation of both the Pink and Carnation, as a number of both flowers are shown, one in three colours and another in two—these are double flowers. I have identified the old 'Crimson Clove' and the double white garden Pink on this painting. Unfortunately such pictorial evidence is of the greatest rarity.

The earliest flower book illustrated several varieties of a lovely Carnation known as 'Ye Gallant's Fayre Ladye,' later known as 'Painted Lady' Carnation (Fig. 19). It is a white semi-double flower with the upper petals painted in red or purple, the lower petals are plain; it also possesses a lovely Clove perfume. Up to about a hundred years ago the 'Painted Lady' was grown in most gardens, but about 1850 it was becoming a rare plant and a few years later was almost lost to cultivation. Mr. SANDERSON acquired two plants of the 'Painted Lady' Carnation from a friend, who had obtained them from an old garden in Ireland. From these two plants cuttings were sent to Wisley and Kew; these appear to be the only plants of the 'Ye Gallant's Fayre Lady' known to be in existence.

There appears to be some confusion concerning the Painted Lady Pink, which is sometimes called the 'Painted Lady' Carnation and *vice versa* ; both flowers are white, but whereas the Carnation is painted on the surface of the petals, the Pink is painted on the reverse side. The 'Painted Lady' Pink appears to have gone or at any rate is not far from extinction, as Mr. AMOS PERRY has for some months been trying to obtain this plant for Mr. SANDERSON from friends both in England and

Ireland; possibly it still is in cultivation, if so I would be glad to hear from anyone who may possess it. It too was a denizen of the Tudor walled garden of "painted" flowers which appears to have been so popular in Elizabethan times, and it is described in early gardening books.

In the thirteenth century monks in an abbey near Orleans propagated the first Dianthus with a powerful Nutmeg scent and flavour; it was introduced into England in the fourteenth century and was at a later period known as 'Sops-in-Wine.' There were two of these Carnations, a Clove and a Nutmeg, and both flowers are mentioned by CHAUCER. These plants were considered to be extinct until the discovery of a Nutmeg Clove Carnation, originally planted in 1652 by an ancestor of the present owner, Colonel FENBOW, was discovered last year (Fig. 18). This Carnation is now growing at Wisley and will, I hope, along with the 'Painted Lady,' become very popular with garden lovers.

'Sops-in-Wine' is crimson, like a small 'Crimson Clove,' but the leaves resemble the Pink more than the Carnation but it is, without doubt, a true Carnation.

Everyone is familiar with the 'Crimson Clove,' but the original strain of this plant was lost to cultivation over two hundred years ago, except for a few growing in remote country gardens, and was re-introduced into the country from Holland in the early seventeenth century, when a Dutch merchant visiting this country saw and admired the Crimson Cloves in his host's garden. On his return to Holland he introduced the plant into his own garden from cuttings he had received; later the flower was grown in most Dutch gardens, and it is from these plants our 'Crimson Clove' has descended.

'Raby Castle' Carnation is also a very old favourite, but it was lost to cultivation for some years in the 1850's. It's original name was 'Lord Chatham,' and the flower is shown on a painting in a flower book dated 1780. A recent discovery in a very old garden in Cumberland will restore to cultivation a most lovely early Georgian Carnation. The flower is a large semi-double, the body colour being of a beautiful red shade which I had only seen previously in Chelsea china, the flower is striped with black and has a most beautiful Clove perfume. It will be propagated this year from cuttings obtained from the owners.

The Pinks which have survived to the present day are of the seventeenth and eighteenth centuries with the exception of *Dianthus Plumarius* which, in its original form, grows on the walls of a few ancient buildings. It too was introduced in the eleventh century with the Carnation and is the principal ancestor of the garden Pink. Both this plant and the original form of *D. Caryophyllus* are now in Kew Gardens.

The 'Pheasant's Eye' Pink, both in its single and double forms, is a Stuart Pink, and in due course two other Stuart Pinks will be obtainable, these are 'White Shock' and 'Damask.' They were discovered in old gardens in the North of England. 'White Shock' is of an intense whiteness with very jagged and fringed petals. 'Damask' is a double pale purple shading into red, producing a kind of shot effect, and has a lovely perfume. Another Stuart Pink is 'Old Man's Head,' which has been traced to a garden in the North of Yorkshire, it has purple and white stripes and is spotted; this plant was lost to cultivation for over a century. These Stuart Pinks will be a most valuable addition to the small number of really old Pinks which have survived.

The eighteenth century Pinks are: 'Mrs. Sinkins,' included in a nurseryman's plant list of 1810. 'Inchmery' and 'Little Old Lady,' known in the eighteenth century as the 'Chelsea' Pink, owing to the fact that it was extensively cultivated in that area about 1760, and is shown on a painting dated 1775. The 'Cockenzie' Pink, which was discovered in the fishing village of Cockenzie (Scotland), is the 'Montrose' Pink first propagated in the gardens of Montrose House in the first quarter of the eighteenth century. 'Musgrave' Pink, which has a fringed white flower and green eye, was known at least as early as the 1730's, and is shown on a flower painting of about the middle of the eighteenth century. Concerning this Pink Mr. GEORGE ALLWOOD has sent the following information to the editor: "This Pink I found in a Henfield private garden, I was told that it had been presented to the owner by Mr. MUSGRAVE who had raised it and we named it 'Musgrave Pink' when we distributed the stock."

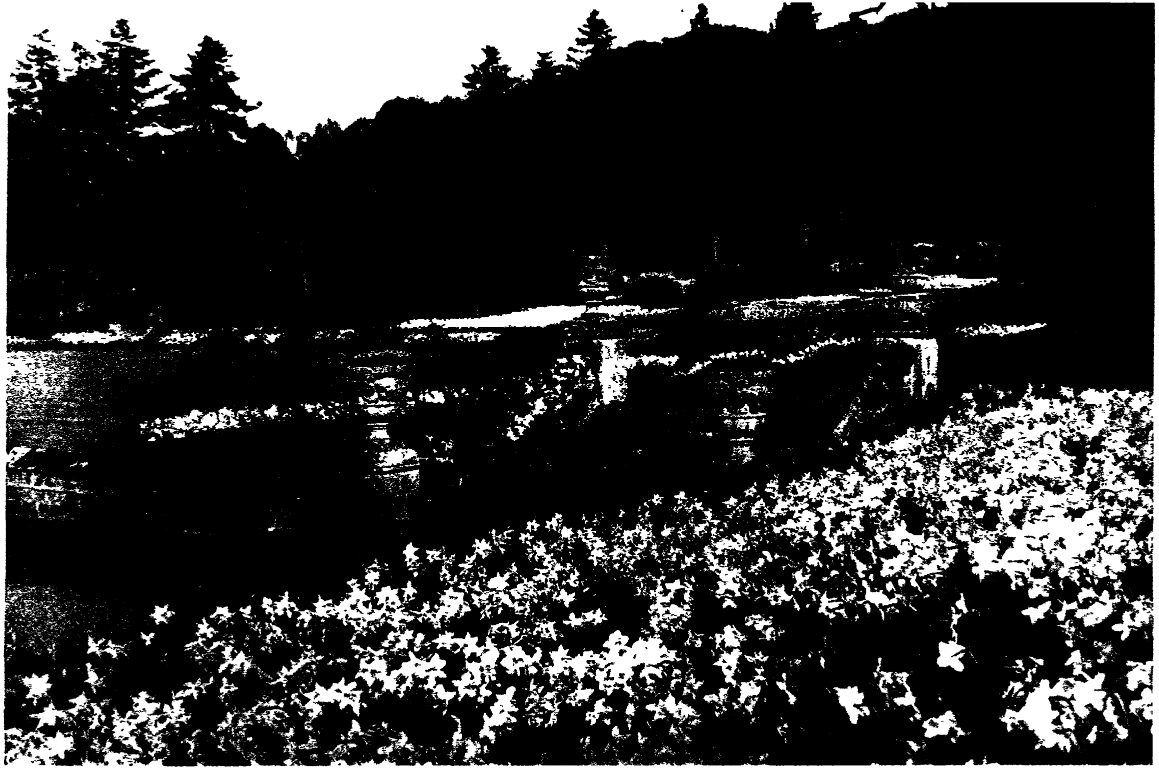
It has been on more than one occasion stated that the seventeenth-century Sweet Johns are no more, but this lovely sweet-scented flower is still with us in the *Dianthus superbus* and its varieties. It was described as the narrow-leaved Sweet William in the time of Queen Anne, when introduced into this country in about 1597 from Austria it was known as 'Pride of Austria.'

A very old Pink still in cultivation is *D. Carthusianorum* introduced in the thirteenth century into this country from Germany by the monks of the Carthusian Order—hence the name of this plant (Fig. 21). The flowers are bearded like the Sweet Williams and Sweet Johns, the leaves are grass-like in appearance and colour, and the purple pink flowers are in clusters borne on long stalks.

From the East one of the ships of the East India Company early in the reign of Queen Anne carried the first seeds brought to this country of *D. chinensis* sent by a member of the Company to a friend in England, and in the reign of George II these beautiful flowers, both in their single and double forms, blossomed in English gardens in almost every conceivable shade and colour (Fig. 20).

There still await discoveries, particularly in Ireland, of a number of old Pinks and possibly a Carnation or two, but these plants must be sought for in remote country gardens where the very old plants have been allowed to remain century after century undisturbed, but it must be borne in mind that in almost all cases the original names of the very old Pinks have been lost, although sometimes they can be identified from old paintings and flower books.

There is in the Oxford University Botanic Gardens a Pink which



Photo, R M Adam]

DAWYCK

FIG. 5.—STONEWORK AND DAFFODILS

[*To face p.* 22.

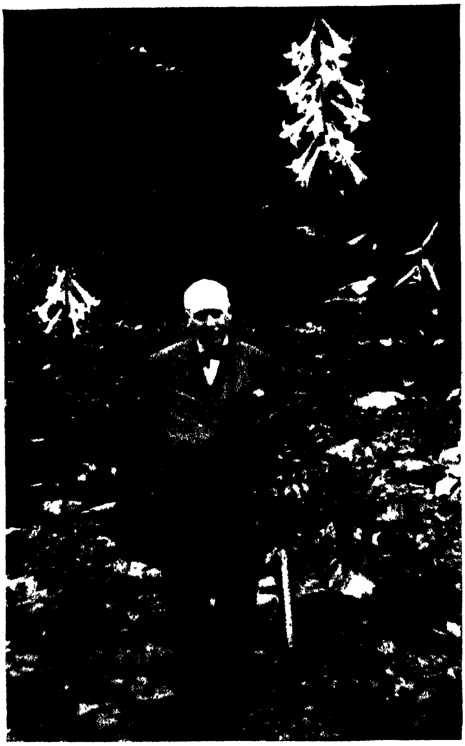
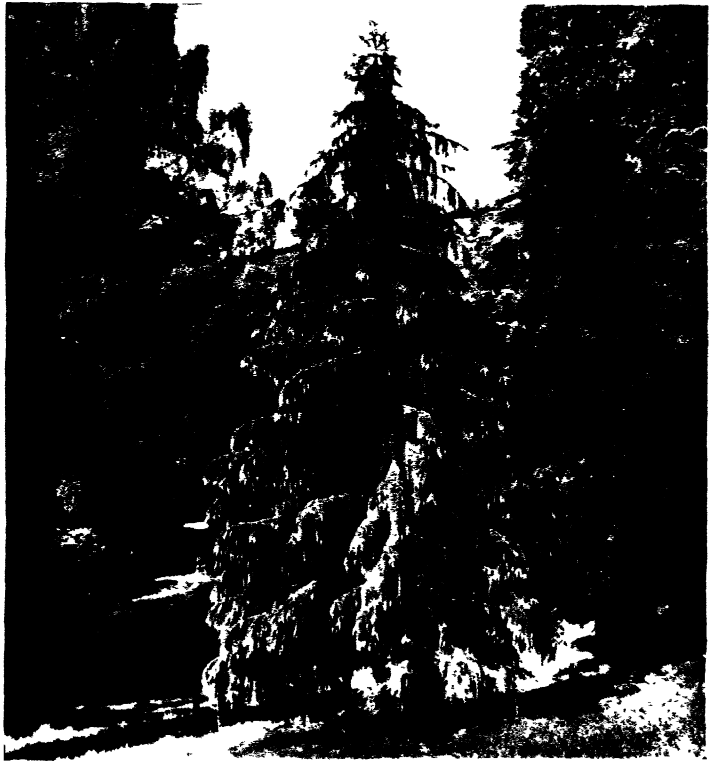


FIG. 6.—MR. F. R. S. BALFOUR AND LILIUM GIGANTEUM. (See p. 10.)

Photo, R. M. Adam.]

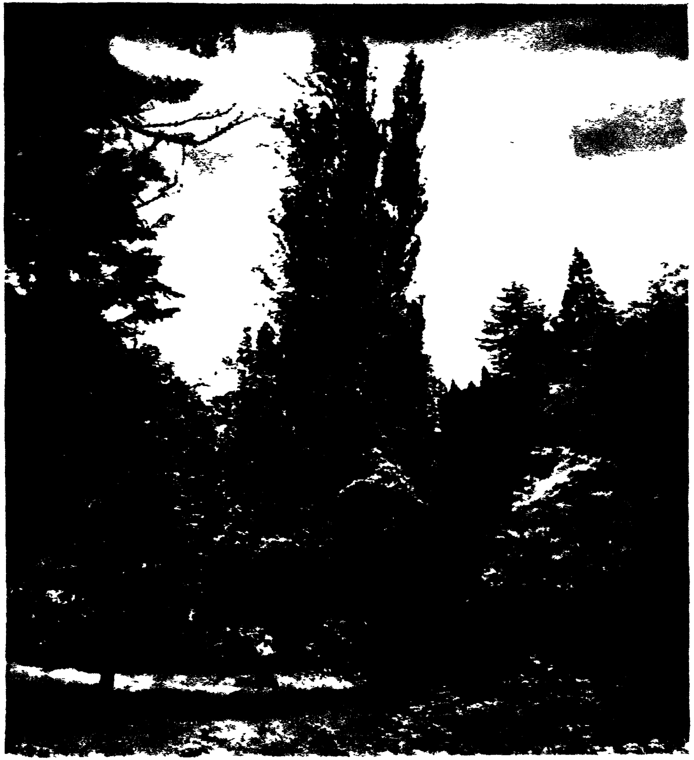
DAWYCK

DAWYCK



Photo, R M Adam]

FIG. 8.—BREWER'S SPRUCE, 1946



Photo, R M Adam

FIG. 9.—DAWYCK BEECH IN 1946

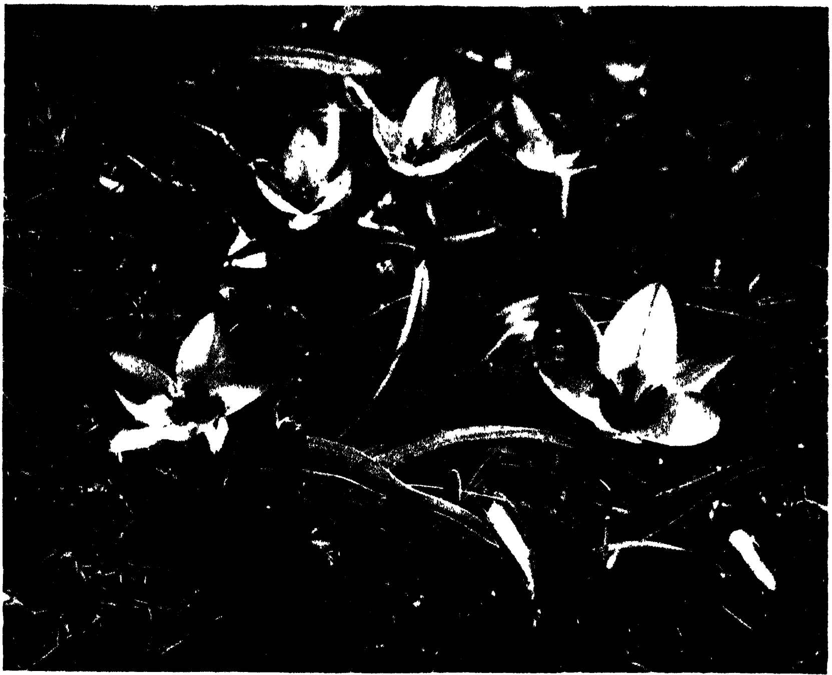
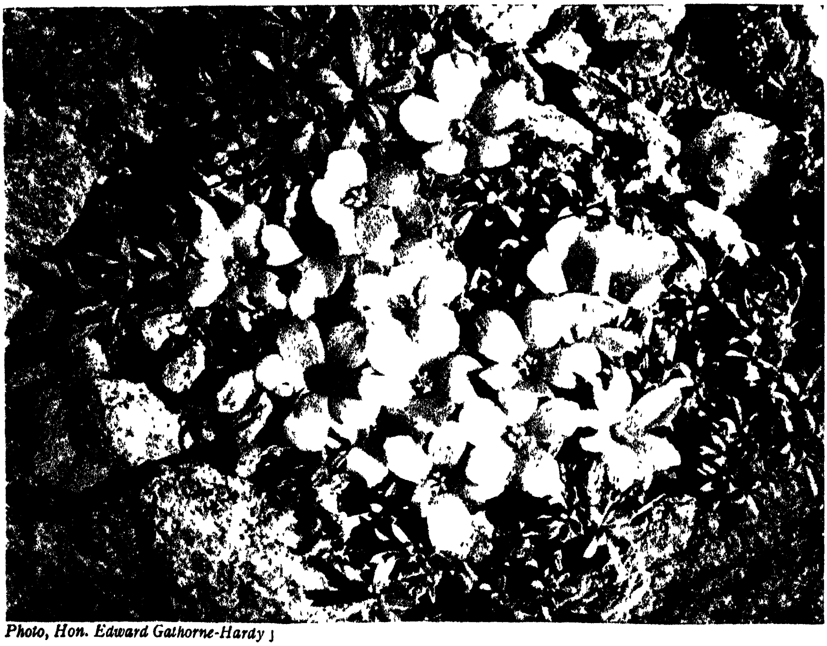


Photo Hon Edward Gathorne-Hardy]

FIG. 10.—TULIPA BAKERI

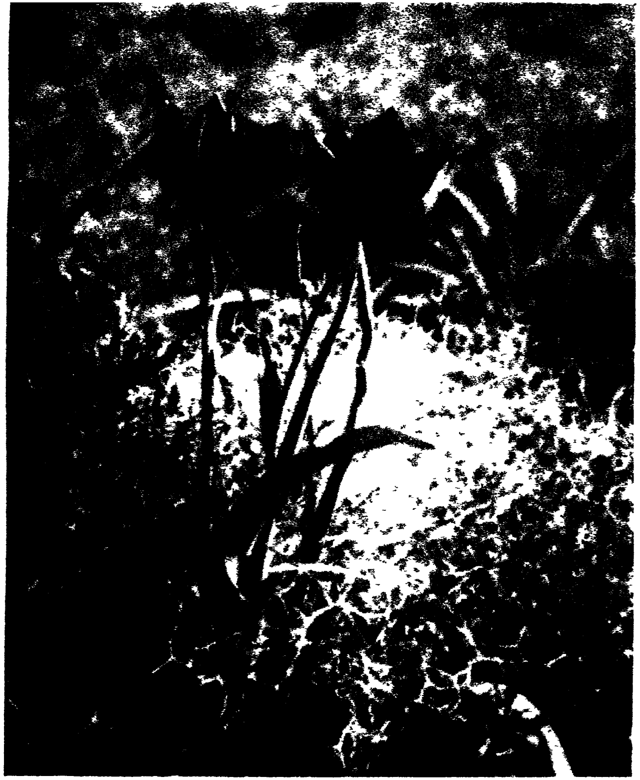
(See p. 15.)



Photo, Hon. Edward Gathorne-Hardy]

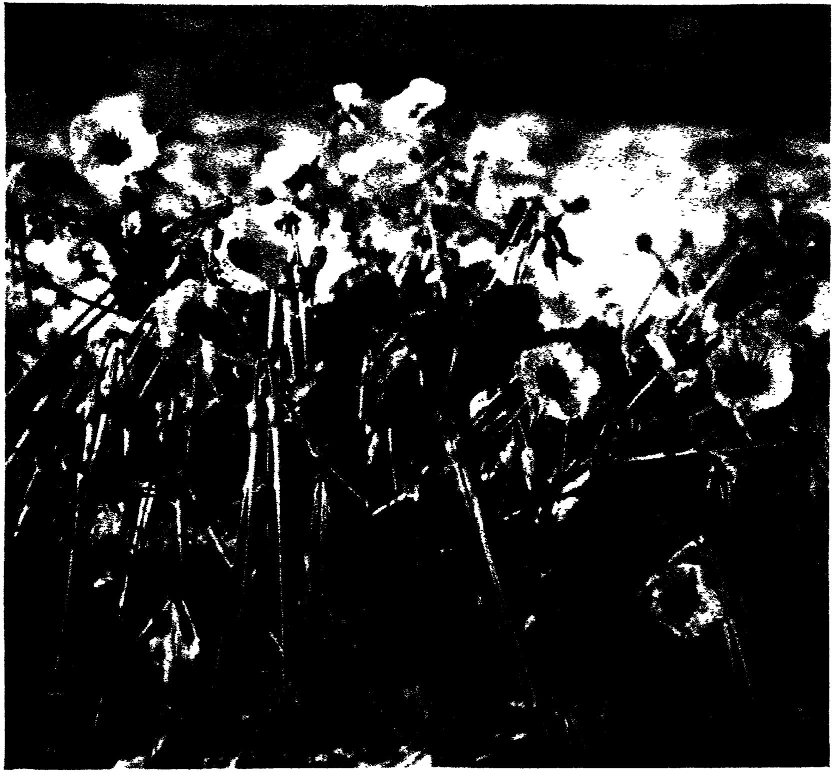
FIG. 11.—LINUM ARETIOIDES

(See p. 14.)



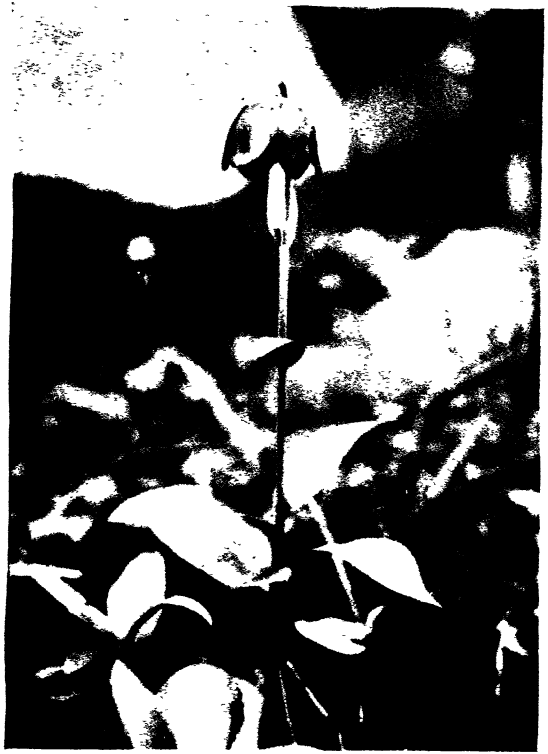
Photo, P. H. Davis

FIG. 12.—TULIPA CYPRIA GROWING THROUGH POTERIUM SPINOSUM CYPRUS. (See p. 16)



Photo, P. H Davis

FIG. 13.—ERODIUM ARBORESCENS (See p. 13.)



Photo, P H. Davis]

FIG. 14.—FRITILLARIA DAVISII TURRILL

(See p. 15)

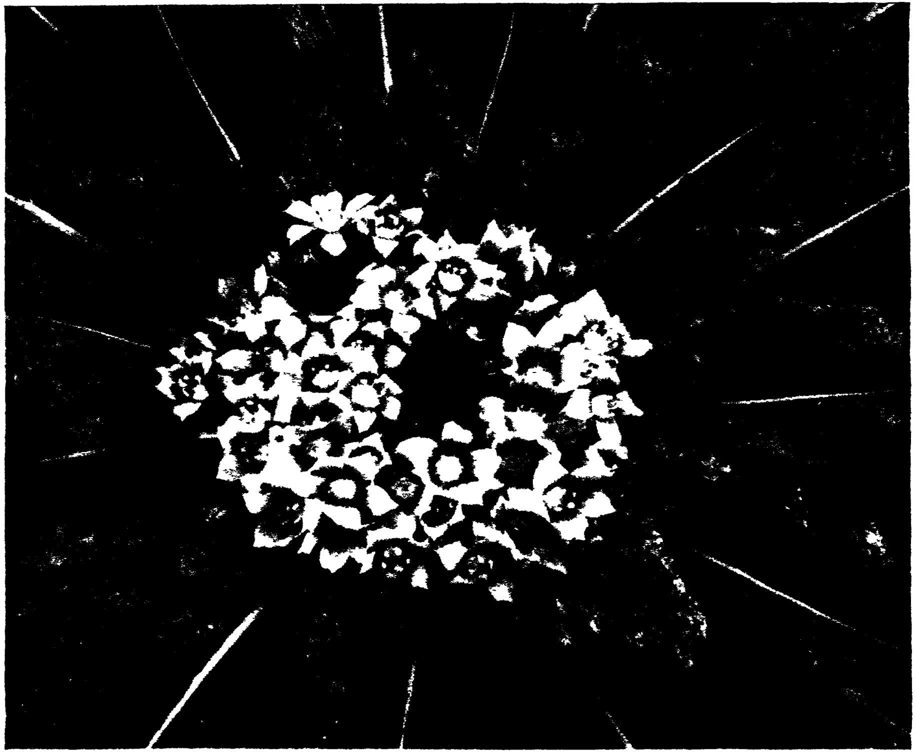
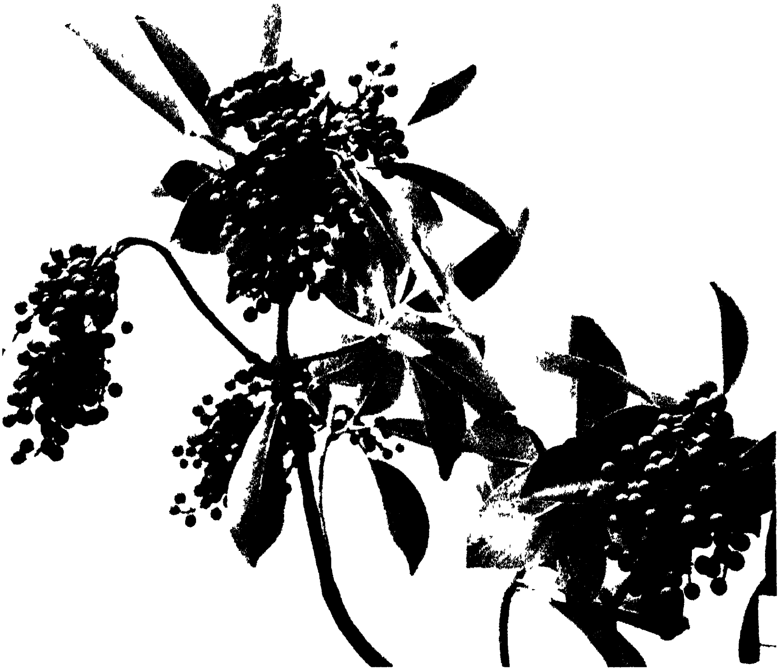


Photo P H Davis]

FIG. 15—THE MANDRAKE: MANDRAGORA HAUSKNECHTII, CRETE

(See p. 15)



Photo, R. A. Malby.

FIG. 16. ARBUTUS MENZIESII ELFY'S FORM F.C.C. NOVEMBER 5, 1946.
(See pp. 32 and 39)

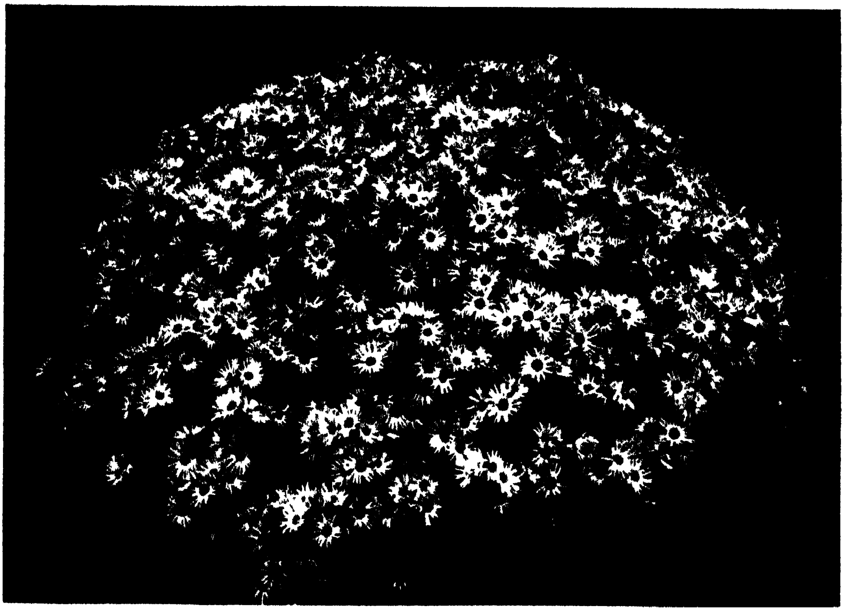


FIG. 17.—CHARM CHRYSANTHEMUM
(See p. 17)

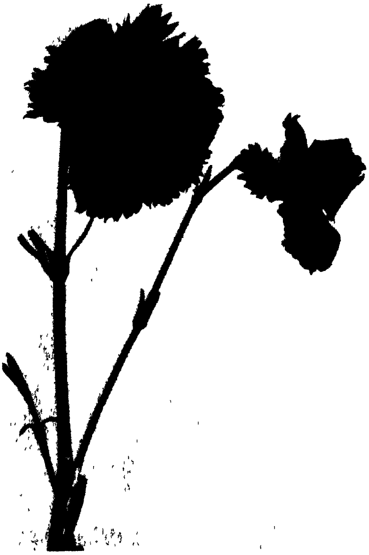


FIG. 18.—'FENBOW NUTMEG' CLOVE CARNATION. 13TH CENTURY

(See p. 21.)

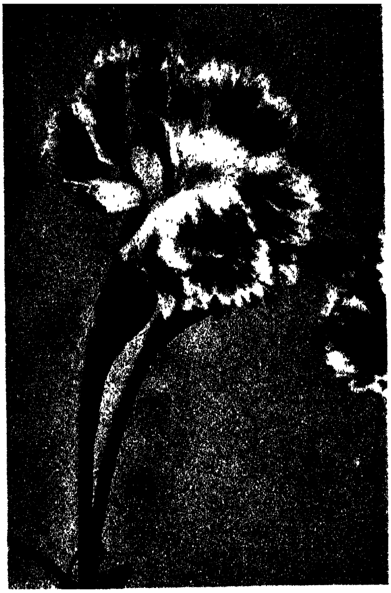


FIG. 19.—'PAINTED LADY' CARNATION. LATE 16TH CENTURY. (See p. 20.)

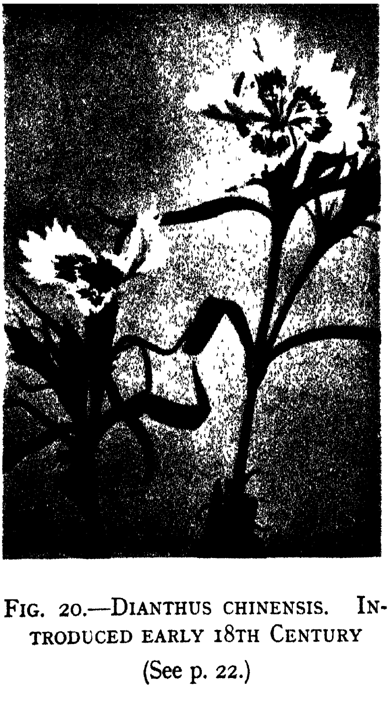


FIG. 20.—DIANTHUS CHINENSIS. INTRODUCED EARLY 18TH CENTURY

(See p. 22.)

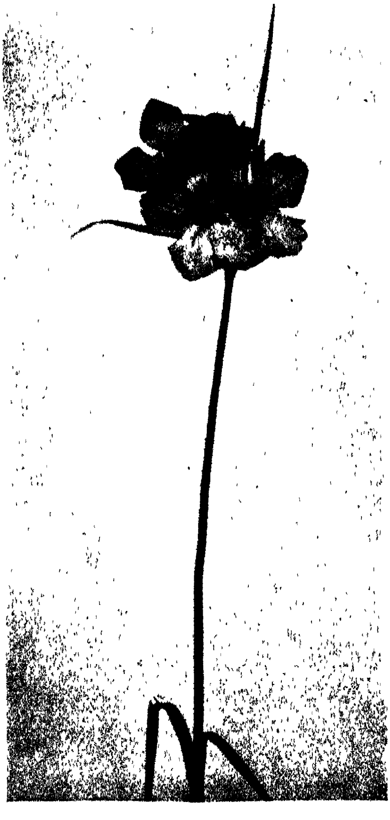


FIG. 21.—DIANTHUS CARTHUSIANORUM (BEARDED PINK). 13TH CENTURY

is known to be very old and according to the old label its name is given as 'Double Ruby' Pink, but apart from its great age nothing is known about it, and Mr. ROBINSON the Curator of the garden sent to Mr. SANDERSON this summer some cuttings of this Pink and a flower, but owing to the faded condition of the flower it was impossible to identify it; now two of these cuttings have not only rooted but have thrown up a flower stem and some good flowers. It may possibly be that fine old Pink known in former times as 'Bat's Double Red.' THOMAS BAT was a gentleman who lived in the second half of the 17th and the early years of the 18th century, and who raised and propagated Pinks in his garden near London. There was a 'Bat's White' Pink, a 'Bat's Pink' Pink and a 'Bat's Double Red' Pink which as previously mentioned is possibly the plant growing at Oxford.

A clergyman living in Buckinghamshire who has a fine collection of old Pinks and Carnations has sent Mr. SANDERSON a rooted cutting of the 'Delmonden Fairy' Pink, this was found in an old manor house garden at Delmonden, Kent, a few years ago. It is described by its owner as being of a lovely warm shade of shrimp pink with faint lacing in scarlet near the centre. Although a Pink the erect growth of the plant suggests the Carnation. It is obviously very old and may be one of the Pinks which was raised by an enthusiastic amateur Pink grower in Kent in the middle of the 18th century.

Mr. GEORGE WILLIAMS who lives a few miles from Beverley has an old Pink in cream, red, and yellow which is very old and was known in his great grandfather's time as the 'Beverley' Pink. The ground colour of this Pink is a rather dark red flaked in white and yellow. Mr. WILLIAMS is in his eighty-sixth year and his great grandfather was born towards the end of the 18th century, so the Pink must be at least a hundred and fifty or a hundred and sixty years old.

GARDENING IN LIMA

By Christopher Sandeman

(*Lecture given on August* 13, 1946; Major A. PAM *in the Chair.*)

PERU, though a small country compared with Brazil, which covers a greater area than the United States, is the third largest republic of South America, being five times the size of Spain. When considered as a whole, Peru must always be thought of as a country composed of three sharply contrasted geographical divisions: first, the narrow coastal desert, averaging some hundred miles in depth, which runs for 2,300 miles from just south of Ecuador nearly to Valparaiso; secondly, the vast Andean range, that backbone of a continent, which, starting in the extreme north of Venezuela, peters out in the Antarctic at Cape Horn; and, thirdly, the vast, uncharted region of tropical forest of the

Amazonian plain, which stretches from the eastern side of the foothills of the Andes to the Atlantic.

The division of a country as large as Peru into three regions only is perhaps a little over-simplified, for whereas the western foothills of the Andes at 4,000 feet have, except for the ephemeral vegetation of the foggy winter months, little plant life but cacti and xerophytic scrub, on the Atlantic side of the Cordilleras, at the same elevation, the mountain sides are still covered with luxuriant tropical growth. And as the Andes must always be thought of as two, often three, roughly parallel chains, it is obvious that in their deep valleys many variations of climate and vegetation are found.

To-day, it is with the first division, the coastal desert, that we must chiefly concern ourselves, for it is here, only eight miles from the Pacific, that Lima, City of Kings, is situated.

The statement sounds paradoxical that in a town only 12 degrees south of the Equator, where rain practically never falls (the appearance of an umbrella in Peru's capital would excite both astonishment and merriment), soil and climate are none the less, where water is available, admirably suited to the cultivation of an enormous variety of native and exotic plants. Unlike the barren, saline soil of the Sahara desert, much of the Peruvian coastal zone, with guano (a Government monopoly) at hand from dozens of islands, the haunt of myriads of sea-birds, scattered up and down the coast, is crying out for cultivation, and vast fields of sugar-cane and cotton testify to the magnificent crops which can be grown where water from the turbulent mountain torrents of the Andean western slopes is available for irrigation. But from a gardener's point of view it is the blessed Humboldt current which, during a normal winter—that is, roughly from May to the end of October—produces the strange phenomenon of a tropical region of barren, waterless, Sahara-like country, combined with a grey sky and intensely humid atmosphere. It makes a curious impression to go out in the early morning in Lima to find a leaden sky, pavements wet and greasy, and puddles on the streets, although anything like what we call rain has probably not fallen for some years. It is this cold Humboldt current, which is a part of the southern Antarctic drift, that is responsible for a dense sea-fog, which produces in the valleys and on the high foothills of the western side of the Andes an ephemeral but very interesting and beautiful plant life, known as the Lomas vegetation. I remember well the astonishment with which I saw in a little valley, only a quarter of an hour by car from the heart of Lima, where the last time when I visited it not a blade of grass was to be seen, a rich and varied flora growing in such abundance that the hill-sides showed green. Plants in full flower, all dripping with moisture, as though there had been a heavy downpour of rain, included three or four species of Calceolarias, three Solanums, one almost meriting the often mendacious description in catalogues of a "desirable garden plant," and a very beautiful Loasa, bright yellow, though not altogether "desirable" on account of its stinging leaves and stems, characteristic of the family. I have given seeds of this Loasa to Kew

Gardens, and it may possibly be susceptible of cultivation there as a half-hardy annual. One of the most beautiful of Peruvian Amaryllids, the orange-flowered *Hymenocallis Amancaes*, is abundant in this valley. Other Lomas plants growing here included *Begonia geraniifolia* with large cream-coloured flowers and handsome foliage, a pretty scarlet-flowered prostrate plant, Bowlesia, some composites of no garden value, a dainty Alstroemeria or Bomarea with small brick-red pendent flowers tipped green, the lovely *Heliotropium peruvianum*, and, greatly to my surprise, a fern, a tall Adiantum. I have never seen Heliotrope growing more magnificently than in Peru, and I well remember a shady gully in the Arequipa region where these shrubs with their powerfully fragrant flowers, including a white form, grew to a height of 7 feet. A closely related Tournefortia, a shrub 7–8 feet high with strangely perfumed flowers, also a native, is cultivated in Lima gardens, but it is not one of the plants of the Lomas vegetation. Two yellow-flowered shrubs, one also a member of Boraginaceae, the other a Bignoniad, Cordia and Stenolobium, are both widely distributed on the western side of the Andes. The former I have never seen cultivated in Lima gardens, the latter infrequently. Both deserve a place in any garden. Another interesting native of the dry western zone is a leguminous shrub or shrubby tree, *Caesalpinia tinctoria*, with shining dark green Robinia-like foliage, and terminal trusses of orange-yellow flowers. It is also extremely attractive when covered with its bright-red shining fruits, like broad pea-pods about 6 inches long. These pods are economically valuable and large quantities are exported to be used for tanning. This shrub I have never seen in cultivation, but another leguminous shrub, *Caesalpinia Gilliesii*, with bright lemon-yellow flowers and long protruding crimson stamens, is an enchanting commonplace of Lima gardens. Its formidable thorns also recommend it for hedge-planting, and certain stretches of road going out of Lima are bordered with it for a quarter of a mile or more. *Caesalpinia Gilliesii* is not a native of Peru, though its wide distribution and tendency to naturalize itself where it is happy might easily lead to that assumption. Certain plants introduced by man have naturalized themselves throughout the length and breadth of Peru, notably *Spartium junceum*, a native of Southern Europe, often cultivated in Lima gardens. The common white Richardia of African origin I have seen growing in its thousands at Molinopampa, an obscure Cordillera village some days' march from the nearest highway. It has also travelled far down the river Tarma from the outskirts of the town of that name 9,000 feet above sea-level to 4,000 feet in the tropical zone, where it looks as " native and indued " as do the thousands of Eucalyptus trees planted all over the western slopes of the Andes for the sake of their rapidly matured wood in a region where native timber of any size is almost non-existent. Various garden forms of Hibiscus, that fragrant white-flowered invader from tropical Asia, *Hedychium coronarium*, which delights in marshy ground in full exposure, and the beautiful polygonaceous climber, *Antigonon leptopus*, with its vigorous habit and wealth of bright carmine-pink flowers, are cultivated not only in Lima, but in the humblest gardens throughout the country. The introduction of exotic plants can sometimes prove as disastrous to their adopted countries as rabbits have become in Australia or the grey squirrel in this country. The common bramble brought to Chile by a nostalgic German has become a menace to agriculture by spreading far and wide, forming impenetrable thickets and ruining pastures, as has the excessive increase of two other exotics, the mauve-flowered Gallega of our herbaceous borders and a Marguerite Daisy.

On the upper reaches of the Paraguay River near the Brazilian-Bolivian frontier, I have travelled in a small steamboat which was forced to backwater, further progress having been made impossible by the huge mass of the lovely periwinkle-blue Water-hyacinth, *Eichornia crassipes*, which most of you have seen growing at Kew Gardens, piling up on our bows. Its introduction into the creeks of Florida by a gardening enthusiast has resulted in the blocking of many waterways. The tendency of certain exotics to multiply out of all measure suggests the thought that the origin of a species is not necessarily in the country best adapted to its increase. I often cursed the day when I introduced an attractive yellow Oxalis into my garden in the south of Spain, for it ruined lawns and was as impossible to eradicate as is an Oxalis in Kew Gardens. Dozens of species of the Oxalis family are widely spread through the length and breadth of the Andes. In Chile on the outskirts of Lake Puyehue, wherever the forest is cut, Foxgloves have become the dominating flower, and Eschscholzia, the Californian Poppy, from humble beginnings on a heap of rubbish on the outskirts of Valparaiso, has travelled hundreds of miles along the railway nearly as far south as Puerto Montt.

The Chilean flora, being natives of a country with a more temperate and moister climate, are far better adapted to cultivation in the British Isles than the flora of Peru. In fact *Tricuspidaria lanceolata*, *Abutilon vitifolium*, *Embothrium coccineum*, *Desfontainea spinosa*, *Fabiana imbricata*, *Tropaeolum speciosum* and *Buddleia globosa*, a native of Peru also, are as happy in south-west Scotland and Ireland as in their native haunts. The leaves of the last-named shrub, *Buddleia globosa*, are, I know by experience, an efficacious remedy applied to sores, ulcers or burns. In both Chile and Peru an enormous number of plants have been habitually used for generations as traditional remedies. When walking in remote places with a basket full of botanical specimens, it is more usual than not to be stopped by a passing Indian and asked with interest: "What remedies are those in your basket?" I have often thought that my efforts to explain that the *raison d'être* of my specimens was a purely scientific one were regarded incredulously as a base attempt on my part to conceal valuable medicinal secrets. While on the subject of herbal remedies, I have often wondered why greater interest has not been taken in *Cecropia peltata*, a small tree the leaves of which are much used in the form of an infusion by Indians as a febrifuge and, according to them, an infallible remedy for an influenza cold in its initial stage. This tree, which belongs to Moraceae, is one of the most widely distributed of the southern continent. The flowers are inconspicuous; but its right-angled branches and the silvery-grey reverse of its horse-chestnut-like leaves, when stirred by the wind, make it a pleasantly conspicuous object of the tropical forest, and not of the forest only, for it has worked its way from the Amazonian plain up most of the great river's tributaries to an elevation of 5,000 feet on the eastern slopes of the Andes. Ashes from its wood are rich in potash. One of the world's most famous medicinal trees, the Cinchona, from the bark and roots of which quinine is derived, grows chiefly on the eastern side of the Andes. The genus consists of some thirty to forty species, and the scented pink or white flowers of many of them are much visited by humming-birds. As most of you probably know, it is to the Condesa DE CHINCHON, an intrepid lady, twice married to Viceroys of Peru, that we owe the introduction of this specific against malarial infections. Brought to Europe in 1639 by a member of the Society of Jesus, Jesuits' bark, as it was called, was long regarded with disfavour by Protestant doctors. The genus was named by LINNÆUS after the much-travelled Condesa, and to this day all who have contracted malaria should remember her name with gratitude. The word "quinine" is derived from the Indian name quinuaquinua. .

I fear I have strayed rather far from the subject of gardening in Lima, but I think I have said enough to make it clear that Lima's tropical climate is sufficiently modified by the influence of the Humboldt current for gardeners to start with the dice loaded in their favour. Continuous sunshine for more than half the year is ample for the needs of hundreds of Australian and South African plants, while the grey skies and overhead moisture of the rest of the year, unaccompanied by violent tropical downpours, makes possible the cultivation of many plants which would not survive in an average tropical climate. With these manifold advantages it must be confessed that, although Lima gardens are gay and colourful, the variety of plants cultivated leaves much to be desired, especially where Peru's endlessly rich native flora is concerned. I have never seen in any Lima garden a single species of the many lovely indigenous Melastomads. The splendid Tibouchinas with their wealth of royal purple blossoms, the myrmecophilous Tococas with their magnificent longitudinally-veined leaves, and even the less showy Miconias are all worthy of cultivation. Seeds of a purple-flowered, very floriferous Brachyotum, which I sent to Kew Gardens, have germinated well, and will, I hope, become honoured inmates of the cool house, although despised and rejected in their native country. Native Fuchsias are not in cultivation except one or two species in the small and—for want of funds—sadly neglected Lima Botanical Garden. I have found as many as six different species growing within half a mile of each other in the Carpis rain-forest, a favourite collection-ground of RUIZ and PAVON and of their French colleague, DOMBEY, all worthy of cultivation; but Lima gardeners prefer the hybrid forms.

Native Ericaceae are also sadly neglected. They might prove difficult in Lima because most of them grow at an elevation of over 5,000 feet, but Bejarias with their usually sticky, bright pink and dark red flowers (the so-called Andean Azalea) I have found at an elevation of 2,000 feet, and almost certainly some of the many indigenous species of Cavendishia, Macleania, Gaultheria, Thibaudia, Vaccinia and Ceratostema could be established.

The native *Thunbergia alata* (lemon or orange yellow with a black eye) is in cultivation, also its rarer white form, and the exotic *Thunbergia grandiflora* with its large Parma-violet coloured flowers I have seen covering the whole front of a house, its wealth of blossoms making the leaves invisible. Some of you may know this lovely climber from having seen it in Riviera gardens, where it is a rather shy plant and intolerant of frost.

Bougainvillaea in many colours is a standby of Lima gardeners, but I have never seen in cultivation the native tree, *Bougainvillaea peruviana*, which, with its pale magenta bracts, is a lovely feature of the higher slopes of the upper Marañon country. Among indigenous shrubs, Cassias with their buttercup-like blossoms and long flowering season, acrid-smelling Lantanas, the lovely Datura with large white and pale apricot pendent trumpets, are universally grown, and, though less frequently, sweetly scented Brunfelsias, and Callistemons with their bright crimson bottle-brush inflorescence. Among dozens of exotics, special mention should be made of Poinsettias, which form splendid shrubs, several Bignoniads, including *Pyrostegia venusta* (formerly known as *Bignonia venusta*) with its dazzling display of orange-apricot flowers, Stephanotis, Plumbago, Allamandas, which are as easily grown as Honeysuckle in an English garden, and when at their zenith flower so luxuriantly that they almost conceal their leaves; and of course Oleanders, which are planted for miles along roads on the outskirts of Lima, though they only look really happy where they can' be given abundant water. The double, strongly scented carmine-pink variety is most commonly planted, but a single white and a dark crimson form, also single, are cultivated by the more discriminating. The exotic *Lagerstroemia indica* with trusses of La France rose pink blossoms forms trees over 20 feet high, has a long flowering season and is one of the joys of Lima gardens, more especially when associated with the native Jacaranda, covered with a mist of hyacinth-blue flowers.

The powerfully fragrant Frangipani is a popular exotic shrubby tree. An exquisite lemon-yellow variety has found its way into Lima gardens from the cloisters of the Monastery of St. Francis. It is strange that no attempt has been made, so far as I know, to introduce into cultivation that lovely little tree of high places, *Buddleia incana*, with its silvery leaves and trusses of burnt orange globular flowers. Apart from *Buddleia variabilis* I have never seen any other species cultivated in Lima gardens, although *Buddleia Colvillei*, the prince of the genus, and especially *Buddleia Farreri*, which REGINALD FARRER describes as "the harbinger of hot, dry lands and the lower tropical barrens," should feel perfectly at home in Peru's capital. Stranger still, that lovely native, *Cantua buxifolia*, the sacred flower of the Incas, a shrub with greyish box-like foliage and bell-shaped flowers compound of

Tyrian purple and glowing scarlet, is rarely seen in cultivation. The many indigenous Solanums have no horticultural standing in Peru, but I have occasionally seen *Solanum Wendlandii* from Costa Rica in cultivation A shrubby species, which is frequent near Tarma at some 9,000 feet, with deep violet flowers and handsome leaves with a russet reverse, would be an ornament to any garden. None of the indigenous Lobeliads (Contropogon or Siphocampylus) are cultivated, nor the extremely beautiful proteaceous Embothriums, one carmine-pink, one cream-coloured, the former with handsome blue-grey coriaceous foliage, which are common in many places in the Cordilleras. An attempt should certainly be made to introduce some of the fascinating South African Proteas. They are easily raised from seed, as I discovered when I gardened in the south of Spain; but the lime in the soil there was quickly fatal to the young plants. The proteaceous *Grevillea robusta* from eastern Australia, often grown in England for the sake of its graceful foliage as a pot-plant, becomes in Lima a forest tree.

Gardens in the City of Kings are full of surprises, and I remember being puzzled at first by a tree some 20 feet high with pale hyacinth-blue flowers in whorls on a long spike, which seemed vaguely familiar. Closer inspection revealed that it was *Vitex Agnus-castus*, which I had last seen growing as a small shrub near the sea-shore in the late summer in the Antibes district of the French Riviera. Another surprise was a handsome bignoniaceous tree from Madagascar, *Kigelia pinnata*, with dark red flowers and fruits over 1 foot in length hanging on long peduncles. Most annuals, more especially those which are a feature of Riviera gardens, such as Stocks, Cinerarias, Antirrhinums, Nemesias, Schizanthus, Salpiglossis, Larkspurs, etc., prosper exceedingly, and I have never seen South African composites, such as Arctotis, Agathea, Venidium and *Gerbera Jamesonii*, more completely at home. Gerberas especially, grown originally from seed introduced by an Englishman, have increased and multiplied so that many beautiful varieties are now one of the most popular flowers grown for the Lima market. Of the many South African bulbs which could be successfully grown, Freesias, Crinums, Ornithogalum are fairly frequent, and I have occasionally come across Antholyzas, *Sprekelia formosissima* and a white and pale magenta Watsonia. So far I have never seen Sparaxis, Brodias, Tritelias and the many Gladiolus species, of which the scented *Gladiolus tristis* grew like a weed in both my Spanish and Riviera gardens. Two other South African plants, which enjoy great popularity in Lima gardens and are easily cultivated, are the Agapanthus and the musaceous *Strelitzia Reginae*, the blue and yellow flowers of which have a strange resemblance to the crested head of a crane. *Strelitzia Reginae* was named in honour of George III's Queen, who was born Princess Charlotte of Mecklenburg Strelitz. Both plants form enormous clumps, and I have seen Agapanthus thriving in the subtropical region uncared for on the site of long abandoned habitations.

Garden varieties of Narcissi or Tulips cannot be grown in Lima; but some of the more attractive species such as the Cretan *Tulipa* *saxatilis* with its shiny, bright green foliage, and the two handsome scarlet species from Asia Minor, *T. Eichleri* and *T. Gregii*, would certainly be worth trying, if you could persuade your Cholo gardener to cease watering them during their resting season.

All succulents such as Echeverias, Crassulas, Gasterias and Mesembryanthemums can be, and are, grown with the greatest ease, also Aloes and various species of Cacti. In spite of the fact that the mountain slopes within a few miles of Lima are covered with Cacti and that the woolly *Opuntia floccosa*, looking like a flock of recumbent sheep, is one of the characteristic plants of the High Andes, nothing has been attempted which can be compared either as a collection or for effective planting with Monaco's famous Jardin Exotique.

Palm trees are of course easy to cultivate in Lima, although few species are grown out of scores of possibilities; but the stately avenue of *Oreodoxa regia* of the Avenida Arequipa is worthy of any capital.

The exotic 'Norfolk Island Pine' (*Araucaria excelsa*) enjoys an inexplicable popularity in Peru—perhaps because it is unexacting in its requirements. To me it has always the appearance of a Noah's Ark tree, though I have seen two fine specimens in a Lima garden looking decorative, in a purely artificial way, when floodlit from below for a garden fête. *Araucaria imbricata*—the too well-known Monkey Puzzle from the western slopes of the Chilean Andes—is seldom grown. This Araucaria was introduced into cultivation in England about a century and a half ago as the result of a dinner at Valparaiso, at which a botanist surgeon, MENZIES by name, who sailed with Captain VANCOUVER in the *Discovery*, noticed some unusual-looking nuts being served at dessert. He took some away from the dinner, and the last Monkey Puzzle tree grown from these fruits survived until 1892 in Kew Gardens. A striking sight is a forest of these trees at the foot of the snow-line on the volcano Llaima. Another species of Araucaria, the lovely *Araucaria braziliensis* from southern Brazil, I have seen only once in Lima. It deserves to be widely grown. It, some fine specimens of the Chinese *Paulownia imperialis*, and the dazzling *Erythrina splendens*, covered with thousands of flowers looking like scarlet parrots' beaks, are the chief ornaments of the plaza of Viña del Mar near Valparaiso.

Catalogues of more or less familiar names have an uninspiring ring in a lecture hall, so I will not do more than just mention a few other trees cultivated in Lima gardens. These names include a Plane tree (*Platanus occidentalis*), the beautiful Chinese *Ginkgo biloba*, an Ash (*Fraxinus pennsylvanica*), a stem-rooting Ficus, which forms a noble forest tree, *Magnolia grandiflora*, with which you are all familiar growing against the walls of many English houses, the Pawpaw (*Carica papaya*), which produces poor fruit in Lima, the drought-resisting Schinus (the so-called False Pepper-tree), one of the most widely distributed native trees and particularly handsome when covered with its clusters of rosy fruits. Two Oaks planted at the entrance to the British Embassy are growing rapidly. The Banana, Orange, Lemon, Prunus and Pomegranate are also grown; but the fruits from Lima trees are of an inferior quality. On the other hand, oranges from the tropical region of Chanchamayo are perhaps the best I have ever eaten, but they are very thin-skinned and are useless for export. While on the subject of oranges, I am reminded of an interesting fact I was told by the German expert in charge of the Citrus section of the Estacion Experimental at Tucuman in northern Argentina, that cold nights are necessary to produce the chemical changes which turn the skins of oranges bright yellow, and for this reason the fruit grown in the enormous groves between São Paulo and Rio de Janeiro remains greenish and is therefore unpopular in the English market.

Most of the trees I have just mentioned are exotic in Peru, and it is a matter for regret that many thrillingly lovely native trees such as a Bombax with masses of fleshy, deep rose flowers, beloved of the melodious and easily tamed hang-nest bird, which lights up the forest of the Perené River, and a dazzling polygonaceous Triplex with flowers surrounded by scarlet bracts looking like small shuttlecocks (a relative of our lowly Dock) are ignored by Lima gardeners. A magnificent specimen of the latter tree standing alone on the banks of the river Mayo is one of my most cherished botanical memories.

Hedges of Pomegranate, of which the young growth, after the shrubs have been clipped, has the delicate brownish-pink tones of newly unfolded rose-leaves, and trimmed Cypress hedges, with creditable topiary effects, are characteristically charming features of many Lima gardens.

Most private gardens in Lima are too small to afford scope for an artistically planned whole ; but one of the capital's most lovely suburbs has grown up in the middle of an ancient olive-grove, where as many as possible of the old trees have been spared, with the result that a most happy and satisfying effect has been achieved. I have never been a snob about Geraniums (using the word in a colloquial gardening and not in a botanical sense), although I must confess that sight of the gnarled trunk of a patriarchal Olive tree encircled by scarlet hybrid Geraniums is hard to bear. Not that these beautiful flowers with their enormous trusses of glowing colours are not often a delight in the right place. Even in an olive-grove white-flowering varieties would be entirely venial ; but in Lima Geraniums are, like the showy and easily grown Canna, often the last resource of the horticulturally resourceless.

The dozens of species of Pelargoniums with aromatic leaves, of which so notable a collection used to be grown in the Aldenham gardens, are nearly all unknown in Peru ; but it must always be remembered that Pizarro's capital made a late start in the art of gardening, so that as a hobby it is still in its infancy, while as a science it has hardly been weaned.

I hope a stressing of omissions has not made my remarks sound captious, for it would indeed be churlish not to acknowledge the great pleasure that a traveller can derive from seeing the many lovely plants which grow so luxuriantly in the gardens of Lima, which are not the least of the many attractions of Peru's enchanting capital.

NOTES FROM FELLOWS

Ginkgo biloba

THIS Conifer is one of the few plants which, although it is in wide cultivation both in the Far East and in English gardens, has, it is believed, never been found in the wild state.

In No. 1, Vol. II, of that learned Chinese publication *Icones Plantarum Omeiensium,* Plate 149, it is stated that:

> " This tree has been found not uncommon at the foot and lower slopes of Mount Omei and other districts of Szechuan Province, usually cultivated near either Temples or at the side of houses."

On reading this account, I had thought it possible that here at last was a record of the plant growing in a wild state, but on enquiring of the writer, Professor Fang, he stated that:

> " *Ginkgo biloba,* Linnaeus, is found very common in the woods and by the roadsides far away from the temples or houses on Mount Omei. I believe that it is cultivated and not really wild."

The original native habitat of the tree therefore still remains to be discovered.

Another point of interest about this tree is that fossil remains of it are found in the Triassic series of rocks which geologists say were formed over 120 million years ago, and that these fossil remains are practically identical with the trees as we know them to-day.

ABERCONWAY.

Arbutus Menziesii, Pursh.

Bot. Mag. t. 8249; *A. procera,* DOUGLAS, Bot. Mag. t. 1753. ELWES & HENRY, Vol. 3, p. 565. BEAN, Vol. 1, p. 201. **F.C.C.**

The Editor of the JOURNAL writes to me that *Arbutus Menziesii* appears to be little known as a fruiting tree and asks me to send him a note about the plants that are here (Fig. 16).

My attention was attracted to this species by seeing the veteran *Arbutus Menziesii* and *A. Andrachne* in the Victoria Park at Bath so about 1910 I bought seedlings from a French nurseryman of which seven are now growing at East Bergholt. I cannot claim to have been attracted by its fruit, it was the glorious red bark and fine foliage that caught my eye and it does seem curious if the fruit has been generally disregarded since W. L. JEPSON (quoted in BEAN'S book) writes of " masses of red fruits," BEAN and also ELWES and HENRY respectively describe it as being orange-coloured and orange-red. In my experience the fruit is exceedingly variable in colour. Some evidence—essentially practical—of this can be deduced from the fact that I have two specimens of identical size, one at my front gate and another opposite my front door, the former lives unnoticed the latter seldom fails to attract attention from the most casual visitors. The fruit of my trees varies in colour from the rich crimson-red of the plant awarded F.C.C. November 5, 1946, to orange-red and a rusty reddish yellow that might well be called inconspicuous.

I regard with caution and some suspicion any hardy plant introduced long ago (DOUGLAS sent home the Madrona in 1827) that, in spite of an appealing beauty, has become rare in cultivation ; one feels that there must be a " catch in it somewhere " and wonders what it may be. The Madrona has the reputation of being a bad mover, but that is scarcely enough to account for the scarcity of a plant that in the opinion of Mr. BEAN—a consummate judge of garden values—is " one of the most beautiful of all broad-leaved trees." It would be valuable to obtain more light upon this matter. As to hardiness, my best specimens have full exposure to the bitter East and North-East winds that torment us in Suffolk and I have seen it growing wild on Vancouver Island. My trees were planted about 1910 and were an appreciable size in 1919 and several of them are now about 27 feet in height with a girth of 27 inches.

The old specimens at Bath prove that *A. Menziesii* is not a lime-hater and it may well be that it is a lime-lover, perhaps some of those who expend much care upon growing lime-haters are at times unable to forget that among the other plants they grow are many that are lime-likers as well as some that are lime-demanders. I suspect that *A. Menziesii*, in spite of its membership of the Heath family, is at least a lime-liker. In my garden there is definite evidence that *A. Menziesii* will not *thrive* if planted in the damp lime-free soil that my Rhododendrons enjoy ; yet it is reported to grow magnificently in the moist rich valleys of California. My best specimens are growing on very poor light soil in exceedingly dry situations with a rainfall of about 22 inches.

CHARLES ELEY,
East Bergholt, Suffolk.

A Further Note on the Brothers William and Thomas Lobb

In a short paper on the LOBBS in the R.H.S. JOURNAL in February 1942, I said that I had been trying to find a record of the baptism of the two brothers in the registers of the parish churches of Perran-arworthal and Devoran. But I was looking in the wrong place. Happily since then I have been put on the right track by Mr. THOMAS OATES, the headmaster of the school at Wadebridge.

Through the kindness of the present Vicar, the Rev. C. T. ROWLAND, I have at last found the two entries of which I have been in search. They are as follows :

> William, son of John and Jane Lobb, baptised March 12, 1809.
> Thomas, son of John and Jane Lobb, baptised August 5, 1817.

The latter entry gives the father's profession as carpenter and his address as Lane End.. This is a hamlet on the road to Bodmin near Pencarrow, and JOHN LOBB was employed in carpentry and building chiefly on the Pencarrow estate. It appears that he was more interested in the wild life of the woods and fields and in trapping and hunting than in the work of a carpenter. A bachelor brother died and left him some property, and he seems to have neglected his own business and to have got into financial difficulty.

At that time the Vicar of Egloshayle was a Mr. CARLYON (1833–49) who had a brother, Dr. CARLYON, in practice in the neighbourhood of Carclew. With the help of the CARLYONS JOHN LOBB was able to obtain the post of gamekeeper to Sir CHARLES LEMON at Carclew, an occupation much more congenial to his tastes. The family (which now seems to have included another son JAMES and a daughter JANE) moved with their father, and subsequently WILLIAM was employed in the garden of Scorrier House, as I stated in my former paper. The further statement, which I there repeated, to the effect that WILLIAM later became gardener to Mr. STEPHEN DAVEY of Redruth is apparently incorrect. It was THOMAS, and not WILLIAM, who was gardener to Mr. DAVEY, and Mr. DAVEY employed him at Bochyn in the parish of Cury, an ancient manor house with a considerable garden which had come into the possession of the Davey family.

As plant collectors for the firm of VEITCH the brothers were two of the most energetic and practical travellers that that enterprising firm ever had. WILLIAM collected in the temperate regions of South and Western America (1840–59), and THOMAS in the tropics, Java, Burma, India, Borneo and Malay, and he also visited Japan (1843–62). The plants introduced by WILLIAM are accordingly hardier than those introduced by THOMAS, which include a number of Orchids.

During the recent war I had an opportunity of working through the long series of volumes of the *Botanical Magazine*. I found WILLIAM associated with no fewer than a hundred of the plants figured, and THOMAS with sixty-one. WILLIAM is actually named in eighty-nine cases; in the other eleven the *Botanical Magazine* refers only to a collector of VEITCH'S, but a comparison with *Hortus Veitchii* makes it clear that WILLIAM LOBB is the collector in question. Similarly THOMAS is named in fifty-three cases, but he is clearly the VEITCH'S collector referred to in the other six. I have recorded the references in the *Botanical Magazine* to these seventeen identifications in a list at the end of this paper.

The first reference to WILLIAM in the *Botanical Magazine* occurs in 1842 (*Gloxinia speciosa*, t. 3934) though he is not actually named. His name first appears in 1843 (*Begonia coccinea*, t. 3990). The last reference I have noted is as late as 1923 (*Primula suffrutescens*, t. 8990).

The first reference to THOMAS in the *Botanical Magazine* is found in 1846 (*Aeschynanthus purpurascens*, t. 4236). The last, apart from t. 9283 (1929) which clears up the question of the Berberis found by THOMAS in Java in 1845 (cf. t. 4656 and t. 9153), occurs in 1881 when t. 6567 depicts *Bulbophyllum Beccarii*, one of the most gigantic of the Orchids, discovered in Borneo in 1853. Its flowers have an odour of putrid fish, loathsome beyond description.

The main series of references in the *Botanical Magazine* begins for WILLIAM in 1842 and for THOMAS in 1846. Thence forward both brothers appear several times in almost every volume till 1860. Twice the *Botanical Magazine* confuses the two brothers. In 1849 *Lapageria rosea* (t. 4447, and similarly p. xli of Mr. Botting Hemsley's account of the early history of the *Botanical Magazine* in the Index Volume of 1901) should be associated with William and not with Thomas, and *Hypericum oblongifolium* (1856, t. 4949) was found in Assam by Thomas and not by William. The extent to which Thomas was forgotten after his retirement to Devoran is curiously indicated by the reference in the *Botanical Magazine* in 1867 (t. 5649, *Dendrobium macrophyllum*) to "the late Mr. Thomas Lobb." The said Mr. Thomas Lobb was not buried in Devoran churchyard till May 3, 1894!

The proposed tablet in Devoran parish church to the memory of the two brothers Lobb (to which reference was made in my former paper) was unveiled by Lord Clifden on Friday, October 2, 1942, and the R.H.S. kindly sent a contribution towards it. The same day we planted in the churchyard four plants, the first three introduced by William and the fourth by Thomas: *Berberis Darwinii, Escallonia macrantha, Tricuspidaria lanceolata,* and *Hypericum Hookerianum.* These plants were kindly presented by Messrs. Treseder of Truro, and they are all doing well.

More recently, in view of the actual record preserved in the Baptismal Register of Egloshayle, it was felt that Wadebridge should have some little memorial of the two distinguished Cornish plant collectors born in its neighbourhood. So on the afternoon of Friday, November 23, 1945, a little function took place at the school, and I brought four plants from my garden at Truro which we planted in honour of the brothers: *Abutilon vitifolium, Myrtus Ugni,* an Escallonia and a Fuchsia. They too are so far doing well I am glad to say. Present on the occasion was a former headmaster of the school, Mr. Bray, who as a boy had lived at Devoran and remembered "Tommy Lobb" walking along every morning to visit his married sister Mrs. Michell, who lived in St. John's Terrace. The village did not realise, he said, what a great man he was.

J. W. Hunkin, D.D.,
Bishop of Truro

References in the *Botanical Magazine* to William Lobb where he is not actually named:

1842, t. 3934 (*Gloxinia speciosa*), t. 3958, t. 3961.
1848, t. 4414.
1851, t. 4582 (*Cantua buxifolia*).
1858, t. 5077 (*Aesculus californica*)
1860, t. 5165, t. 5171.
1862, t. 5335 (*Ourisia coccinea*).
1864, t. 5591 (*Fremontia californica*).
1891, t. 7160 (*Tricuspidaria lanceolata,* wrongly called *T. dependens*).

References to Thomas Lobb where he is not actually named:

1846, t. 4259.
1857, t. 4992 (*Rhododendron Veitchianum*).
1859, t. 5109, t. 5130.
1860, t. 5198 (*Vanda suavis*).
1862, t. 5326.

Allium tricoccum

Allium tricoccum Aiton can hardly be described as a newcomer to British gardens, for the original description of this North American species was based on a plant cultivated at Kew and was published in 1789. However, it long ago disappeared from gardens and there is no evidence of its being again cultivated in England until 1944, when Dr. HAROLD N. MOLDENKE kindly sent me bulbs from Pennsylvania. These have been grown at the Royal Botanic Gardens, Kew, and flowered in 1945. Horticulturally, *A. tricoccum* has no particular virtue. Its flowers are small and inconspicuous, the more or less erect tepals being yellowish white and only 5–7 mm. long. The leaves are lanceolate or elliptic, to 30 cm. long, 7 cm. broad, narrowed at base into a distinct petiole. Botanically, however, it is of great interest; each chamber or loculus of the ovary contains only one ovule instead of the usual two. The leaves have withered by the time the first flower opens, but this happens in other species of *Allium*. On these characters J. K. SMALL founded in 1903 a new genus Validallium comprising the one species *V. tricoccum* and this has been accepted by various American botanists since the plant is certainly very different from the other American species of *Allium*. It is much more akin to the Old World species *A. Victorialis* L. of sect. *Anguinum* G. Don and *A. ursinum* L. of sect. *Ophioscorodon* (Wallr.) Endl., with which it agrees in being a broad-leaved woodland plant with rounded seeds, but its solitary ovules justify its being placed in a new section, **Validallium** (Small) Stearn, syn. genus *Validallium* Small, Fl. S.E. United States, 264 (1903), Man. S.E. Flora, 289 (1933), of which it is the only species. *A. tricoccum* is figured in Britton and Brown, Illust. Fl. N.U.S. **1.** 412 (1896), Contrib. Lab. Bot. Montréal **14.** 53 (1929), Marie-Victorin, Fl. Laurent. 660, Fig. 236 (1935). Haynes and Ownbey in Rhodora **48.** 61–63 (1946) distinguish "two well-defined ecological races," the one (A) inhabiting low moist woods and having reddish-petioled elliptic leaves 4–7 cm. broad and flower-stems 25–34 cm. high, the other (B) inhabiting upland woods and having greenish-petioled lanceolate leaves 1·3–3 cm. broad and flower-stems less than 25 cm. high.

W. T. STEARN.

WISLEY TRIALS, 1946

BROAD BEANS AT WISLEY, 1946.

THE stocks of Broad Beans were sent for trial in 1946. The seed was sown, on March 12, in double rows 1 foot apart, 10 inches between the seeds, and 2 feet 6 inches between each double row.

Good commercial stocks of the following varieties were grown as standards for comparison: 'Dwarf Fan,' 'Early Mazagan,' 'Giant Four-Seeded White Windsor,' 'Unrivalled Green Windsor,' 'Aquadulce,' 'Bunyards Exhibition' and 'Green Giant Longpod.'

The plants made good growth and were finally inspected on July 22, 1946, by a sub-committee of the Fruit and Vegetable Committee who made their recommendations for awards as given below.

WINDSOR TYPES

Seeds white

Hilum white

King of Beans (J. L. Clucas, Ltd.), **Fillbasket** (Yates & Sons, Ltd.).

Hilum black

Conqueror (raised, introduced and sent by Messrs. Samuel Yates, Ltd., 75, Shudehill, Manchester). **A.M.** July 22, 1946.—A good even stock, with six to eight pods per stem, four to five seeds per pod, pods straight, 6 inches long ; crop heavy.

Queen of Beans (J. L. Clucas, Ltd.).

LONGPOD TYPES

Seeds white

Hilum white

Express (raised, introduced and sent by Messrs. A. R. Zwaan & Son, Voorburg, Holland). **A.M.** July 22, 1946.—A true, level stock maturing early, with a very heavy crop of medium length pods, seven to ten per stem with four to five seeds per pod.

Cobea (Corns van Beusekom).

Hilum black

Peerless (Nutting & Sons, Ltd.), **Leviathan** (G. A. Bunting & Co.), **Dreadnought** (Samuel Yates, Ltd.), **Long Pod Improved** (Ferry-Morse Seed Co.) of Aquadulce type.

Seeds green

Acme (Samuel Yates, Ltd.).

EARLY PEAS AT WISLEY, 1946

TWENTY-FOUR stocks of Culinary Peas were received at Wisley for trial in 1946, one row, 35 feet, of each was sown on March 28, in rows at a suitable distance apart according to the height to which they were expected to attain.

The stocks made good growth and the following varieties were grown as standards for comparison : 'Meteor,' 'Little Marvel,' 'Kelvedon Wonder,' 'Laxton's Progress,' 'Onward,' 'Primo,' 'Exquisite' and 'Gradus.'

The trials were inspected by a sub-committee of the Fruit and Vegetable Committee, who made their final decisions and recommendations for Awards on July 8, as given below.

1 TO 1½ FEET

Seeds round

Feltham First (raised, introduced and sent by Messrs. Watkins & Simpson, Ltd., 27, Drury Lane, Covent Garden, London, W.C. 2).

F.C.C. July 8, 1946.—Haulm 1½ feet, vigorous, rather heavy, yellowish, green ; pods single, a few in pairs, pointed, light green, 3½ inches long-straight ; peas large, six to eight in pod, bright green ; crop heavy. Ready June 22, at least three days earlier than 'Meteor,' very suitable for early crops and under cloches.

Seeds wrinkled

Early Dwarf Hybrid (W. Atlee Burpee).

2 TO 3 FEET

Seeds round

Feltham Advance (raised, introduced and sent by Messrs. Watkins & Simpson, Ltd., 27, Drury Lane, Covent Garden, London, W.C. 2). **F.C.C.** July 8, 1946.—Haulm vigorous, 2 feet, medium green, heavy ; pods mostly single, some in pairs, blunt, straight ; medium green, 4 inches long ; peas large, bright green, six to eight in a pod ; crop heavy. Ready June 26, at least fourteen days earlier than 'Onward,' which it resembles both in foliage and pod.

Aurora (A. R. Zwaan & Son), resembles a dwarf 'Eclipse' ; **Evesham No.** 1 (Yates & Sons).

Seeds wrinkled

Cloche Wonder (F. C. Stonor), not a first-early ; **Kelvedon Wonder, Emerald Podded** (J. L. Clucas, Ltd.), **Little Marvel Improved** (Ferry-Morse Seed Co.), **No. 61** (W. J. Unwin, Ltd.), **No. 72** (W. J. Unwin, Ltd.), **Morse's Progress** (Ferry-Morse Seed Co.), **Resistant Hundredfold** (Ferry-Morse Seed Co.) not a first early, **Timperley Winder** (Samuel Yates, Ltd.) not a first early.

3 TO 4½ FEET

Seeds round

Feltham Forward (raised, introduced and sent by Messrs. Watkins & Simpson, Ltd., 27, Drury Lane, Covent Garden, London, W.C. 2). **F.C.C.** July 8, 1946.—Haulm vigorous, 3 feet, light green heavy ; pods single, blunt, straight, medium green, 3 to 4 inches long ; peas large, bright green, six to eight in a pod ; crop very heavy. Ready June 26, at least a week earlier than 'Exquisite.'

Feltham Radar (raised, introduced and sent by Messrs. Watkins & Simpson, Ltd., 27, Drury Lane, Covent Garden, London, W.C. 2). **A.M.** July 8, 1946.—Characters very similar in every way to 'Feltham Forward' but crop not so heavy. This and the foregoing greatly resemble in colour of foliage and habit 'Foremost.'

British Lion (raised, introduced and sent by Messrs. Thomas Cullen & Sons, Witham, Essex, also sent by Messrs. G. A. Bunting & Co., 3/9, Bucknall Street, New Oxford St., London, W.C. 2, who share the award). **A.M.** July 8, 1946.—Haulm vigorous, 4½ feet, light green ; pods single, some in pairs, straight ; 3½ to 4 inches, medium green, pointed ; peas six to eight in a pod, bright green, mealy ; crop very heavy ; very good, level stocks.

Early Bird (Thomas Cullen & Sons), **Essex Star** (Thomas Cullen & Sons), **Maid of Kent** (G. A. Bunting & Co.), **Tom Clucas** (J. L. Clucas, Ltd.).

OVER 4½ FEET

Seed wrinkled

Early Freezer, No. 2 (raised, introduced and sent by Messrs. Ferry-Morse Seed Co., San Francisco, California, U.S.A.). **F.C.C.** July, 8, 1946.—Haulm 5 feet, vigorous, dark green, heavy; pods single, 4 to 4½ inches long, pointed, dark green, with a kink in the back, resembling 'Gradus'; peas large, sweet and juicy, eight to ten in a pod, bright green. Crop very heavy.

Early Freezer, No. 1 (raised, introduced and sent by Messrs. Ferry-Morse Seed Co.). **A.M.** July 8, 1946.—Characters as foregoing, but a less vigorous stock with a slightly less heavy crop.

Delicious (Miss J. V. Crane), not an early variety.

SOME PLANTS TO WHICH AWARDS HAVE BEEN MADE IN 1946

Amaryllis procera. F.C.C. September 10, 1946. This most beautiful and striking Brazilian bulb, rarely seen in flower, has been fully described by the exhibitor and illustrated in our JOURNAL for November, 1943, pp. 331–2. The cut stem shown bore an umbel of eight open vase-shaped flowers of a bright lavender-violet tone, most heavily marked towards the tips of the narrow, undulated segments, the white throat dotted with similar colour in the upper part. Exhibited by Major A. Pam, O.B.E., F.L.S., Wormley Bury, Broxbourne, Herts. (See p. lxxiv, vol. LXXI.)

Anthemis 'Loddon.' A.M. July 2, 1946. As a hardy herbaceous perennial for the border and for cutting. This very useful variety is a seedling from 'Thora Perry.' The flower heads are 2¾ inches in diameter; the rays a deep tone of buttercup yellow; the disc a shade deeper and measuring slightly more than ¾ inch across. The height of the plant is from 2½ to 3 feet. Shown by Messrs. Thomas Carlile (Loddon Nurseries), Ltd., Twyford, Berks. (See p. lxi, vol. LXXI.)

Arbutus Menziesii fructu coccineo. F.C.C. November 5, 1946. *Arbutus Menziesii*, the Californian Madroña, is a most handsome evergreen tree, usually reaching a height of 20 or 30 feet in British gardens. The oval leaves, up to 6 inches long, are dark glossy green above and glaucous beneath; the pyramidal panicles of white, urn-shaped flowers are succeeded by berries the size of a large pea, typically orange-red but in the present variety a rich, deep scarlet. An attractive feature of the tree is the peeling of the outer bark of the trunk and branches, which falls off to reveal a smooth, cinnamon-brown surface. Exhibited by Charles Eley, Esq., East Bergholt Manor, Suffolk. (Fig. 16.)

Asplenium fontanum (Halleri). A.M. September 10, 1946. A dainty little fern found on limestone mountains from Spain through most of Europe to the Himalayas. The pinnate fronds of the specimen shown were 3 to 4 inches long, ½ to ¾ inch wide, of a deep green tone. Collected in the Pyrenees Mountains by the exhibitor, Miss E. M. Savory, Emberton House, Olney, Bucks. (See p. lxxv, vol. LXXI.)

Brassolaeliocattleya × 'Dawn Angela' var. 'Tennessee.' A.M. October 8, 1946. This is a large and prettily-formed flower, purplish mauve, the labellum ruby-crimson with golden areas in the throat portion. The result of crossing *Lc.* 'Ishtar' with *Blc.* 'Heather Queen.' Exhibited by Mr. Clint McDade, Chattanooga, Tennessee, U.S.A. (See p. v.)

Campanula × 'Gremlin.' A.M. July 30, 1946. A hybrid between *C. cochlearifolia* and *C. mollis*, raised at Wisley in 1942, notable for the profusion of lavender flowers on branching hairy stems 4 to 6 inches tall. The ovate to subcordate, dentate leaves have glabrous blades ½ to ⅝ inch long, but much longer hairy stalks; the spreading sepals are linear, and the open bells ¾ inch wide, ½ inch long, with reflexed tips. (See p. lxix, vol. LXXI.)

Campanula hercegovina var. nana. A.M. July 16, 1946. A dwarfer, more compact variety than the plant which received an Award in 1933, originally collected by Drs. Bevan and Giuseppi in Albania in 1930, and maintaining its character in cultivation. The plants exhibited were almost smothered with up-turned light violet bells, on slender, wiry stems 2½ inches tall. It is completely hardy. (See lxvii, vol. LXXI.)

Carnation 'Eva Humphries.' A.M. July 16, 1946, as an exhibition border variety. A picotee variety with strong, stout stems 13 inches long. Flowers 2½ inches diameter, of good shape, white finely edged bright purple; calyx strong. Raised and shown by Mr. J. H. Humphries, 47 Hardy Lane, Chorlton, Manchester. (See p. lxvi, vol. LXXI.)

Carnation 'Evelyn Knapton.' F.C.C. July 16, 1946, as an exhibition border variety. A white ground fancy with strong, stout flowering stems 18 inches long. Described in R.H.S. JOURNAL, **70,** p. 305. Raised by the late Mr. H. A. Knapton and shown by Lindabruce Nursery, Freshbrooke Road, Lancing, Sussex (**A.M.** 1945). (See p. lxvi, vol. LXXI.)

Carnation 'H. A. Knapton.' A.M. July 30, 1946, as an exhibition variety. A border Carnation, white ground fancy. Flower stems 18 inches long, stout and strong. Flowers fairly full centred, 3½ inches diameter; petals broad and entire, white ground freely flaked and edged Spinel Red (H.C.C. between 0023/1 and 0023); calyx strong. Raised by the late Mr. H. A. Knapton and shown by the Lindabruce Nursery, Lancing, Sussex. (See p. lxix, vol. LXXI.)

Carnation 'Jean Frost.' A.M. July 16, 1946, as an exhibition border variety. A heliotrope self with stout stems 18 inches long; flowers full centred, 3 inches diameter; petals broad, entire, a greyer tone of Pansy Violet (H.C.C. 033/2); calyx strong. Raised and shown by Messrs. F. W. Goodfellow, Valley Nurseries, Aldridge, Staffs. (See p. lxvi, vol. LXXI.)

Carnation 'Marian Allwood.' A.M. November 5, 1946, as a perpetual flowering variety suitable for exhibition. Plant of good, continuous flowering habit, stems 16 to 18 inches long, stiff. Flowers 3 inches diameter, full centred, of good form and substance, salmon-scarlet, petals very slightly cut, calyx strong. Raised and exhibited by Messrs. Allwood Bros., Ltd., Wivelsfield Nurseries, Haywards Heath, Sussex.

Carnation 'Royal Crimson.' A.M. November 5, 1946, as a perpetual flowering variety suitable for exhibition. Plant of vigorous, continuous very free flowering habit with stout, stiff flowering stems 18 inches long. Flowers full centred, 3¾ inches diameter, of good form and very slightly fringed, calyx strong. Raised and exhibited by Messrs. Allwood Bros., Ltd.

Carnation 'Southern Princess.' A.M. July 16, 1946, as an exhibition border variety. A white ground fancy with flowers double, 3½ inches diameter, full centred, petals broad and entire, white splashed and edged with bright scarlet; stems strong; calyx strong. Raised and shown by Mr. F. J. Hayward, 43 Mill Road, Maldon, Essex. (See p. lxvi, vol. LXXI.)

Carnation 'Spencer Davies.' A.M. July 16, 1946, as an exhibition border variety. A yellow self with strong and stout flower stems 15 inches long. Flowers double, 3 inches diameter, full centred; petals broad, entire, wavy, Sulphur Yellow (between H.C.C. 1/2 and 1/3); calyx strong. Raised and shown by Mr. William Thorburn, Millfield Cottage, Old Road, East Cowes, Isle of Wight. (See p. lxvi, vol. LXXI.)

Cattleya × 'Ann Sander.' A.M. July 16, 1946. The spike bore three well-formed flowers in which the sepals and petals are purplish-mauve, the labellum ruby-crimson with a golden throat. The result of crossing *C.* 'Remy Chollet' with *C. Woltersiana.* Raised and exhibited by Messrs. Sanders, St. Albans. (See p. lxvi, vol. LXXI.)

Cattleya × 'Bow Bells' var. 'Snow Queen.' A.M. September 24, 1946. A large and well-formed flower obtained by crossing *C.* 'Suzanne Hye' with *C. Edithiae.* Pure white, except for some orange-yellow colour in the throat of the labellum. Exhibited by Mr. Clint McDade, Chattanooga, Tennessee, U.S.A. (See p. iii.)

Chrysanthemum 'Cotswold White.' A.M. August 27, 1946, as an early-flowering variety for exhibition. Flower stems stiff, 1½ to 2 feet long, clothed with medium-sized foliage. Flowers double, rounded, 4 to 4½ inches diameter, white centre tinged cream. Raised and shown by Messrs. Greenyer Bros., Ltd., Broadwater Green Nurseries, Worthing, Sussex. (See p. lxxi, vol. LXXI.)

Chrysanthemum 'Dorothy Vernon.' A.M. September 10, 1946. An early flowering variety for market. Flowering stems strong, 1½ to 2 feet long. Flowers double, 4½ inches diameter, outer florets margins recurved, inner somewhat incurved, pale rose-pink, reverse of florets gold. Raised and shown by Messrs. J. & T. Johnson, Tibshelf, Derbys. (See p. lxxv, vol. LXXI.)

Chrysanthemum 'Ladybower.' A.M. September 10, 1946. As an early-flowering variety for exhibition. Flower stems stout, 1½ to

2 feet long. Flowers double, 5 inches diameter, outer florets flat, horizontal, rich rose-pink, inner florets with a gold reverse. Raised and shown by Messrs. J. & T. Johnson. (See p. lxxv, vol. LXXI.)

Chrysanthemum 'Salmon Sweetheart.' A.M. August 27, 1946, as an early-flowering variety for market. Plant of good erect, robust habit, producing flower stems 1½ to 2 feet long, clothed with medium-sized foliage. Flowers double, 4½ to 5 inches diameter, flat, Rose Pink (H.C.C. 427/1), reverse of florets at centre Chinese Yellow (H.C.C. 606/1). Sport from 'Sweetheart.' Raised and shown by Messrs. J. & E. Maher, Carisbrooke, South Road, Hampton, Middlx. (See p. lxxi, vol. LXXI.)

Clematis 'Snow Cap.' A.M. October 8, 1946. An attractive white-flowered variety with flowers six inches across, consisting of seven or eight oblong-elliptic petals and a central cluster of creamy-white stamens. Exhibited by Viscount Hambleden, Henley-on-Thames. (See p. v.)

Convolvulus holosericeus. A.M. July 16, 1946. A most uncommon species found by Mr. Ingwersen in Albania in 1937, and grown subsequently in the alpine house. The plant forms a prostrate mat of wiry growths, the ½-inch spathulate leaves chiefly borne towards the ends of the shoots and covered like stems and calyces with glistening appressed silky hairs. The flowers are white, chalice-shaped, 1–1½ inch wide, usually in threes (but may be 1–5), terminally on the young growths. See p. lxvii, vol. LXXI.)

Cyclamen europaeum. F.C.C. September 10, 1946. A most beautiful, long-lived evergreen species, the cordate, crenated foliage marbled above, purplish-red beneath, overtopped by a profusion of sweetly-scented flowers on 5 to 6 inch stems.

The twisted rose-pink petals have a deeper purple-toned mouth of pentagonal form, from which the slender style protrudes. Found wild from eastern France to Jugo-Slavia, and in Trans-Caucasia; long cultivated in Britain. Exhibited by Mrs. G. Anley, St. George's, Wych Hill Lane, Woking. (See p. lxxv, vol. LXXI.)

Cypripedium × 'Joyce Ruck.' A.M. August 13, 1946. This distinct hybrid between *C.* Boltonii and *C.* 'Ballet Girl' is of medium size, the dorsal sepal white with a light greenish base, while the ventral sepal is very similar, but not quite so large. The petals and labellum are greenish yellow. Exhibited by Messrs. Sanders, St. Albans. (See p. lxxi, vol. LXXI.)

Cypripedium × 'St. Swithin.' A.M. September 24, 1946. The tall spike bore three large flowers, light buff with purple-brown markings. The result of crossing *C. philippinense* with *C. Rothschildianum.* Exhibited by Messrs. Sanders, St. Albans. (See p. iii.)

Dahlia 'Mrs. Ed. Halstead.' A.M. September 17, 1946. A bright clear rose pink, large decorative variety measuring 12 inches across with the florets slightly curled and the margins a little reflexed towards the tips. Raised and exhibited by Messrs. J. Stredwick & Son, St. Leonards-on-Sea. (See p. lxxv, vol. LXXI.)

Dahlia 'Dora Ramsey.' A.M. October 8, 1946. A golden apricot large decorative variety measuring 10 inches across. Raised and exhibited by Messrs. J. Stredwick & Son. (See p. vi.)

Delphinium 'Agnes Brooks.' A.M. June 28, 1946. As an exhibition variety. Flower spikes 2½ feet long, pyramidal, flowers evenly spaced. Flowers semi-double, of good shape, 3 inches across, a rich shade of dark clear blue, eye large, white. Raised and exhibited by Mr. F. A. Bishop, Newlyn, Lansdowne Avenue, Oaken, nr. Wolverhampton. (See p. lx, vol. LXXI.)

Delphinium 'Jennifer Langdon.' A.M. June 28, 1946. As an exhibition variety. Flower spikes 2 feet long, tapering, with closely set flowers. Flowers semi-double, 3 inches diameter, rich pale blue shaded mauve, eye black. Raised and shown by Messrs. Blackmore & Langdon, Bath. (See p. lx, vol. LXXI.)

Delphinium 'Mother of Pearl.' A.M. June 28, 1946. As an exhibition variety. Flower species 2 feet long, tapering, flowers semi-double, very closely arranged, 2¾ inches diameter, pale pinkish-mauve, faintly flushed pale blue, eye light brown. Raised and exhibited by Mr. F. A. Bishop, Newlyn, Lansdowne Avenue, Oaken, near Wolverhampton. (See p. lx, vol. LXXI.)

Delphinium 'Sylvia Blackmore.' A.M. June 28, 1946. As an exhibition variety. Flower spikes 2¼ feet long, blunt, flowers very closely set. Flowers 2¾ inches diameter, semi-double, clear pale sky-blue; eye white. Raised and sent by Messrs. Blackmore & Langdon. (See p. lx, vol. LXXI.)

Delphinium 'Watkin Samuel.' A.M. June 28, 1946. As an exhibition variety. Flower spikes 3 feet long, pyramidal with very closely set semi-double flowers 3 inches diameter, a rich shade of medium blue, eye black. Exhibited by Messrs. Bakers, Codsall, near Wolverhampton.

Gentiana × Farorna. A.M. September 10, 1946. A very lovely hybrid of striking colour and apparent vigour between *G. Farreri* × *G. ornata*, parents of G. Devonhall (F.C.C. 1936) by the reverse cross.

Leaves and sepals linear, dark green, the latter somewhat spreading, ½ to ¾ inch long; flowers solitary at the ends of short shoots 3 to 4 inches long, upturned, funnel-shaped, the tube 1½ inches long, 1 to 1¼ inches across the mouth, with a marked swelling midway like that of *G. ornata*, striped green outside, whitish within, conspicuously dotted in lines, lobes butterfly-blue (H.C.C. 6451), not reflexing. Raised and exhibited by G. H. Berry, Esq., The Highlands, Ridgeway, Enfield, Middlesex. (See p. lxxv, vol. LXXI.)

Gentiana Loderi. A.M. July 30, 1946. A prostrate species from Kashmir with glabrous stems radiating from a central crown bearing opposite, cordate to ovate-lanceolate, ½-inch long leaves. The single terminal, upturned, funnel-shaped flowers, 1 to 1¼ inch long, ½ inch wide across the mouth, have spreading, spathulate sepals, and the petals are coloured Gentian (H.C.C. 42) to Cornflower (H.C.C. 742/2) blue. (See lxix, vol. LXXI.)

BOOK REVIEWS

"Honey Production in the British Isles." By R. O. B. Manley. 328 pp. (Faber & Faber.) 18*s.*

This book should be very useful in helping the owner of two or three hives as a hobby, also to the bee-farmer who has 300 hives and whose whole income is dependent on his bees. The author, from more than thirty years' experience, makes the larger number of hives his business, which few writers on the management of bees can do as there are only about thirty persons in the British Isles who have as many hives. The capital required for the small and large enterprise is carefully discussed. Among the subjects of chapters may be mentioned:—British Honey Plants: which include White Clover, Giant Sainfoin, Rose Bay Willow Herb (where woodland has been grubbed, but should not be planted), Ling Heather, Lime. Fruit Trees:—Cherry, Plum, Apple, Pear, Gooseberry, Raspberry. Field Bean, Mustard, Charlock, Pussy Willow, Dandelion.

The different varieties of bees are cautiously dealt with. Yield of honey. Equipment including buildings: Hives, Smoker, Supers, Queen Excluder; Hive Tools, Honey Extractors, Uncapping Knife, Storage Tanks, Wire-embedder. Swarming, Honey Combs, Bees' Wax, Robbing, Feeding, Year's Work, Moving Hives. Comb Honey. Heather Honey Management in Scotland. Preparation of Honey for Sale. Queen Rearing and introduction. Enemies:—House Mouse, House Sparrow, Wax Moth, Wasp, Tree Wasp in Ireland, Bee Louse.

Diseases of Brood:—American Foul Brood, European Foul Brood. Diseases of Perfect Insect: Isle of Wight Disease (Richard Frow treatment); Nosema apis disease. This book one would think should rank as a standard work with F. Cheshire's *Bee-keeping Practical, Scientific,* and Herrod-Hempsall's "Bee-keeping New and Old," but has the advantage of being up to date, and discusses present day problems and difficulties of bee-keeping; it includes American methods and scientific information and recommendations on disease. A chapter might have been on the value of bees to white clover, the cross-pollinating of fruit and the placing of hives in orchards in blossoming time. C. H. H.

"The Hive Bee." By George A. Carter. Illus. (Littlebury, Ltd.) 7*s.* 6*d.*

This is an attractive book of 43 pp., with 24 good photographic illustrations dealing with Bee-keeping through the ages; the Hive family; races of honey bees; life cycle of honey bees; stings; position of honey bee in natural economy; sickness; range of honey bee; nectar and pollen flowers; nectar and honey; honey as a food; wax; honey production on the large scale; behaviour of honey bees.

"Some Properties and Applications of D.D.T." Ministry of Supply Bulletin, 1946. 34 pp. (H.M. Stationery Office.) 6*d.* net.

The author of this *Bulletin*, whose name does not appear, has prepared a brief monograph the object of which, according to the preface, has been "to collect the salient features of the many investigations which affect the practical use of D.D.T." It is admitted that no attempt was made to publish the results of investigations made both in the United Kingdom and the British Commonwealth of Nations, nor even to review the unpublished—nor for that matter much of the published—British work.

The *Bulletin* is divided into seven sections, which deal with the chemical and physical properties of the compound: a general review of toxicity; various formulations; means of dispersal; and toxicity to Vertebrates and Arthropods; together with a brief bibliography of 31 papers. The two Appendices deal with (I) Some Typical Formulations; and (II) A Summary of Results of Field Trials to determine the measure of control of various insects by D.D.T.

The appeal of this *Bulletin* to the practical horticulturist is limited. This is due to the sparseness of information relating to the effect of this new synthetic insectide upon indigenous pests. At least 60 per cent. of the fruit, garden and greenhouse pests listed in the second Appendix are exotic and refer to American species. This *Bulletin* will have an equally limited appeal to the specialist, who is conversant with much of the unpublished work and with most of the published accounts dealing with investigations made by medical, agricultural and horticultural research workers.

The desire for knowledge on the potential merits of this insecticide by agriculturists and horticulturists alike is so keen that a more comprehensive review of the British work is desirable. With this end in view, closer co-operation between the Ministries of Agriculture, Health and Supply is advisable to enable the specialized work of the Plant Pathological Service to be incorporated for the benefit of the British growers. G. F. W.

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JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

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February 1947

THE SECRETARY'S PAGE

Annual Report.—The Annual Report and Accounts are published in this number, and will be presented by the President at the Annual General Meeting on Tuesday, February 18, at 3 P.M. in the Lecture Room of the New Hall. The President will also present the Annual Awards for 1946.

Programme of Meetings.—The programme of meetings arranged for the coming year was given in the December (1946) number of the JOURNAL. The first Show of the year will take place on Tuesday, February 18 (12 noon to 6 P.M.) and Wednesday, February 19 (10 A.M. to 5 P.M.). The next Show will be held on Tuesday, March 4 (12 noon to 6 P.M.) and Wednesday, March 5 (10 A.M. to 5 P.M.).

Lecture.—On Tuesday, March 4, at 3 P.M., Lt.-Col. F. S. SMYTHE will deliver a lecture on the Canadian Rockies, illustrated by coloured slides, in the Lecture Room of the New Hall.

Demonstrations at Wisley.—There will be no practical demonstrations at the Gardens during February, but the following demonstrations will take place in March :—

Vegetable Garden

Wednesday and Thursday, March 5 and 6—Outdoor Seed-bed and Seed Sowing. (2–4 P.M.)

Flower Garden

Wednesday and Thursday, March 12 and 13—Rose Pruning and Pruning of Shrubs. (2–4 P.M.)

Wednesday and Thursday, March 19 and 20—Seed Sowing and Vegetative Propagation of Alpines. (2–4 P.M.)

Fruit Garden

Wednesday and Thursday, March 26 and 27—Spring Spraying of Fruit Trees. (2–4 P.M.)

Examinations in Horticulture.—The examinations conducted by the Society will be held at various centres throughout the country on the following dates :—

General Examination	March 27
General Examination for Juniors	March 27
National Diploma (Preliminary and Final) (written part)	April 12
National Diploma (Preliminary) (practical part)	June 9–13
National Diploma (Final—Section V) (practical part)	June 24–27
Examination for Teachers of School Gardening (Preliminary and Final) (written part)	July 5
Examination for Teachers of School Gardening (Final) (practical part)	September (date to be announced later).

Fruit Year-book.—It is intended to publish a Fruit Year-book towards the end of 1947, as a companion volume to the various other Year-books issued by the Society. It is thought that several Fellows of the Society might like to contribute fruit notes for inclusion in this book. If, therefore, any Fellow has any notes which he thinks would be of interest, he is cordially invited to send them in to the Editor not later than April 19, 1947.

Show of Palestinian Flowers.—The Chairman and Council of Palestine House have made arrangements for a Show of Palestinian flowers to be held at Palestine House, 18 Manchester Square, London, W. 1, on February 17, 18 and 19. The latter two dates are those of the first Show of the year and the Annual General Meeting of the Society. It is believed that this is the first time that flowers direct from Palestine have been shown in this country, and the display should be of interest both from the botanical and horticultural points of view, and well worth a visit.

Sir WYNDHAM DEEDES, the Chairman of the Council of Palestine House, has issued a cordial invitation to all Fellows and Associates of the Society, and admission will be free to them on production of the Royal Horticultural Society's tickets.

An Expedition to Asia Minor.—We have been asked to announce that during the summer of 1947 Mr. PETER DAVIS hopes to collect seeds in the mountains of Western Anatolia in Turkey. Many of these mountains reach 10,000 feet, and although the area is still imperfectly explored botanically it is believed to be exceptionally rich in hardy plants suitable for the rock garden. Among other plants which Mr. DAVIS particularly hopes to collect is *Linum aretioides*, which was illustrated in the January issue of this JOURNAL. He expects to spend July and August in the Lycian Taurus and neighbouring ranges and will personally distribute the seeds to subscribers on his return in the autumn. He is still able to accept a few subscriptions from private gardeners. Single shares will be 10 guineas and double shares 20 guineas. Correspondence on this subject should be addressed direct to Mr. P. H. Davis at St. Vincent, Lewes Road, East Grinstead, Sussex.

WISLEY IN FEBRUARY

THIS month, often so variable in its weather, will show the last blooms from those subjects which have cheered us through the winter, and in addition the first blossoms from those bulbs, plants and shrubs which can truly be called the heralds of spring. A short period of sunny weather, especially towards the end of the month, will greatly increase the floral display in the open.

Iris unguicularis and its varieties still show a few flowers, the last of a display which commenced early in December, and in defiance of frost and snow the plants have never been without a sprinkling of flowers.

On the Laboratory wall *Acacia dealbata* will be expanding its yellow mimosa flowers, if the weather is kind, and a small plant of *Chimonanthus fragrans* var. *luteus* adds its yellow bells to the display.

The Half-hardy house will show many of the plants that were noted in January, with the addition of *Clematis cirrhosa*, a Mediterranean species having pendent white flowers, and *Cassia stipulacea* with bright orange pea-shaped blossoms. In the Temperate house the Acacias will still be in bloom, and several of the varieties of *Camellia japonica*, including the fully double regular flowered 'Mikado,' remain in flower. New subjects will be *Loropetalum chinense*, a white-flowered Hamamelis-like shrub, which is not hardy in the open, and the delightfully fragrant *Luculia Pinceana* with rather Hydrangea-like heads of pink flowers; it is not a suitable subject for pot culture, but wherever space permits well worth planting in a bed, as a permanent feature of a cool greenhouse. On the staging round the house sides will be found in flower Epacris, Erica and Correas, all of which are also represented by larger specimens planted in the centre bed.

Near the entrance to the Wild garden will be seen *Mahonia japonica* with sprays of scented yellow flowers which have been slowly lengthening since December when the first flowers opened. In the woodland will be found several of our earliest flowering shrubs, *Corylopsis pauciflora* and *Stachyurus praecox* with hanging blossoms of primrose, yellow, and orange; *Pieris japonica* should be hung with sprays of small white bells towards the end of the month; unluckily these, like the blossoms of the Stachyurus, are injured by hard frost when fully expanded. Here also will be found *Daphne Mezereum* in both its purple and white forms, with *Hamamelis japonica* and its varieties, which with *Hamamelis mollis* form our most reliable and frost proof early spring display. The bed of *Helleborus orientalis* will be in flower near the end of the Bamboo walk, and sheltered corners in the wood will be covered with the flowers of *Narcissus cyclamineus* towards the end of the month.

A few flowers will be making their appearance in the Rock garden, particularly the early Snowdrops *Galanthus Elwesii* and *G. byzantinus* and the Snowflakes *Leucojum vernum* and varieties *Vagneri* and *carpathicum*, the latter having yellow tips to its perianth segments. Blue is provided by the clear-coloured flowers of *Hepatica angulosa*, with the paler mauve of *Primula Winteri* sheltering beneath some of the larger rocks. The berries of *Pernettya mucronata* still lend colour to the scene, while near the edge of the Wild garden *Sarcococca humilis*, a small shade-loving glossy evergreen shrub, bears sweetly scented but inconspicuous white flowers on the underside of its stems. At the top of the Rock garden several early flowering Rhododendrons provide a display if the weather is kind, but these blooms are very susceptible to frost injury.

The Alpine house is gay with the small bulbous Iris and Saxifrages, *Iris reticulata* with its varieties 'Cantab,' pale blue, 'Aurora,' reddish-purple, 'Wentworth' and 'Royal Blue' of good size and form. These are generally preceded by the clear blue of *Iris histrioides*, a delightful plant for the Alpine house only 3 or 4 inches high when in full flower.

Other bulbous plants which should be in flower this month are the smaller Narcissi, particularly *N. asturiensis*, *N. nanus* and *N. calcicola*, together with *Scilla Tubergeniana*, which resembles but has larger and paler blooms than *S. sibirica*; early Tulips include the pale clustered *Tulipa polychroma*; while *Eranthis Tubergenii*, a hybrid winter Aconite, provides a pleasing pan of yellow flowers. The many hybrid Saxifrages of the Kabschia section are dotted with pink, white and yellow flowers, and *Saxifraga Grisebachii* with velvety crimson spikes rising from grey rosettes never fails to draw admiration.

The Award of Merit garden contains a large specimen of *Cornus mas* which will be covered with small yellow flowers, and *Viburnum fragrans* should be carrying the last of its pale pink blossoms, the end of a display which has graced every mild day since early November.

The Heath garden and Seven Acres will have several fresh shrubs to show: *Erica carnea* and all its varieties will be forming drifts of pink and white, together with *E. darleyensis* and the white of *E. Veitchii*. *E. lusitanica* was in full flower before Christmas on the Rock garden, an out-of-season effort by this pretty species, which sometimes suffers from the frost. Near the large pond *Chimonanthus fragrans*, the Winter Sweet, will be producing its very sweetly scented flowers from leafless twigs; and two early Cherries, *Prunus Conradinae* var. *semiplena*, a semi-double pink, and *P. subhirtella* var. *autumnalis*, a pale pink Cherry which generally flowers both during the autumn and spring, will both be in flower. Here also will be found a large planting of *Hamamelis japonica* and its varieties *arborea* and *Zuccariniana*, the latter with distinct pale yellow flowers and glossy foliage often brilliantly coloured in the autumn. Another unusual yellow-flowered shrub planted here is *Forsythia Giraldiana*, a variable species, often with pale yellow blossoms, which open in February some weeks in advance of *F. spectabilis*. A close relative of the Forsythia also flowering this month is *Abeliophyllum distichum* with sprays of white flowers, represented at Wisley by a small shrub, trained on the wall beyond the glasshouse.

WHEN THE AMATEUR SHOULD PICK AND HOW HE SHOULD STORE APPLES AND PEARS

By Dr. Cyril West

(Ditton Laboratory, East Malling, Kent)

(*Lecture given on October* 8, 1946: DR. R. G. HATTON, C.B.E., F.R.S., V.M.H. *in the Chair.*)

APPLES and Pears are living organs, having a definite potential span of life depending largely on the variety. In some varieties the ripening changes are completed on the tree or soon after gathering, as in the case of the early or "summer" varieties such as 'Beauty of Bath,' 'Lord Gladstone' and 'Worcester Pearmain' Apples or 'Williams' Bon Chrétien' Pears. In others they are completed after periods varying from a month to several months, as in the case of the late varieties, 'Laxton's Superb,' 'Newton Wonder' and 'Bramley's Seedling' Apples or 'Doyenné du Comice' and 'Conference' Pears. Obviously only those varieties that have a long potential life should be stored. The object of successful storage is to retard the ripening changes as much as possible without unduly affecting the quality and attractiveness of the fruit, and in this way to prolong the period during which it is available for use.

In this paper only the methods available to the amateur or small grower who has no special facilities will be considered.

When to Pick

The stage of development at which the fruit is gathered may be even more important than the actual conditions within the store. This point will therefore be dealt with in some detail. It can perhaps best be approached by a brief consideration of the five main phases through which the fruit passes during its development.* From the bud stage to a point in time some two or three weeks after petal-fall, when the size of the fruit is roughly that of a walnut, the cells that make up its tissues are continually dividing. In other words, growth during this period is by cell multiplication. During the next two to three months, while the fruit is rapidly enlarging, each of the fifty million or so cells present increase in size; in other words, growth takes place by cell enlargement. With the advent of autumn, growth in size of the Apple tends to come to a standstill. The change that occurs at about this stage is a vital one and has been termed the *climacteric*. When this change is complete the fruit may be said to have reached maturity. It separates naturally from the tree, and, as a detached organ, passes through a senescent phase. Finally, if it has not previously fallen a victim to some invading fungus it becomes mealy, flavourless and soft, and progressive functional breakdown of the tissues brings its life to a close.

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* The statements made in this paper are based mainly on data obtained with 'Bramley's Seedling' Apples: they apply, however, in a general way to most long-keeping varieties of Apples and Pears.

A convenient index of the physiological and chemical changes going on within the fruit is provided by the intensity of respiration, as indicated by the rate of production of carbon dioxide (Fig. 1). The respiratory activity is greatest at the beginning of the life of the fruit, *i.e.* when the cells are rapidly dividing. By the time cell-division has practically ceased the rate of respiration has fallen to about a fifth of its original value. During the long period of growth by cell-enlargement there is a gradual decrease in activity. At the onset of the climacteric the rate of respiration shows a sudden and marked rise. At this stage the production of the various volatile substances which play an important part in the storage of the fruit (see below) shows a marked increase. Senescence is characterized by a gradual fall in the rate, and the final breakdown of the tissues is usually marked by a very sudden rise followed by a rapid fall to zero activity.

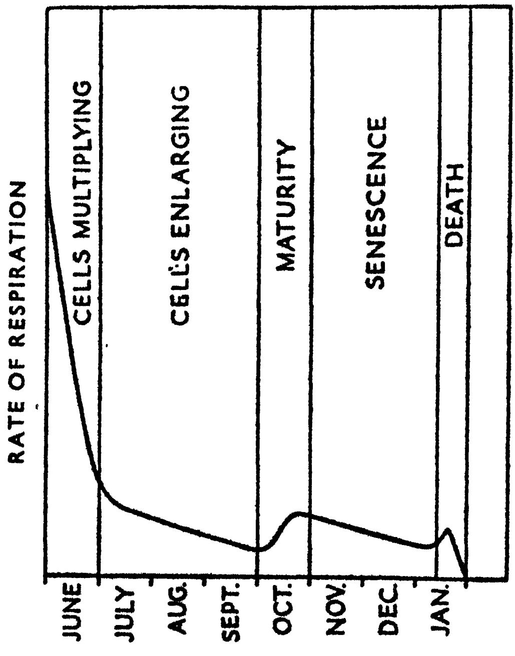

FIG. 1.—RESPIRATORY ACTIVITY (PER UNIT FRESH WEIGHT) OF 'BRAMLEY'S SEEDLING' APPLES THROUGHOUT THEIR LIFE-CYCLE.

In the case of the Pear the melting-ripe stage is reached at approximately the point at which the climacteric rise in activity attains its maximum value. With this fruit senescent changes, *e.g.* sleepiness of the flesh, follow very rapidly, and the rate of respiration shows a correspondingly rapid fall to zero activity.

'Bramley's Seedling' Apples are usually picked between the middle of September and the middle of October, these dates varying, of course, from season to season according to the weather conditions prevailing during the summer and early autumn. It will be seen that the portion of the life-cycle that falls between these dates may include not only the whole of the climacteric, but also part of the pre-climacteric and post-climateric phases.

The advantages and disadvantages of gathering the fruit at various points over this critical interval of time are discussed in the following paragraphs.

Size and Weight of Crop

The size and weight of individual fruits show a definite increase during the interval under consideration (Fig. 2). In the case of 'Bramley's Seedling' Apples, for instance, there may be a gain in the average weight of the fruit during the last week in September and the first week in October of from 5 to 10 per cent. It should be borne in mind, however, that the value of this gain in weight may be more than offset by the effects of high winds and gales which are to be expected at that time of the year.

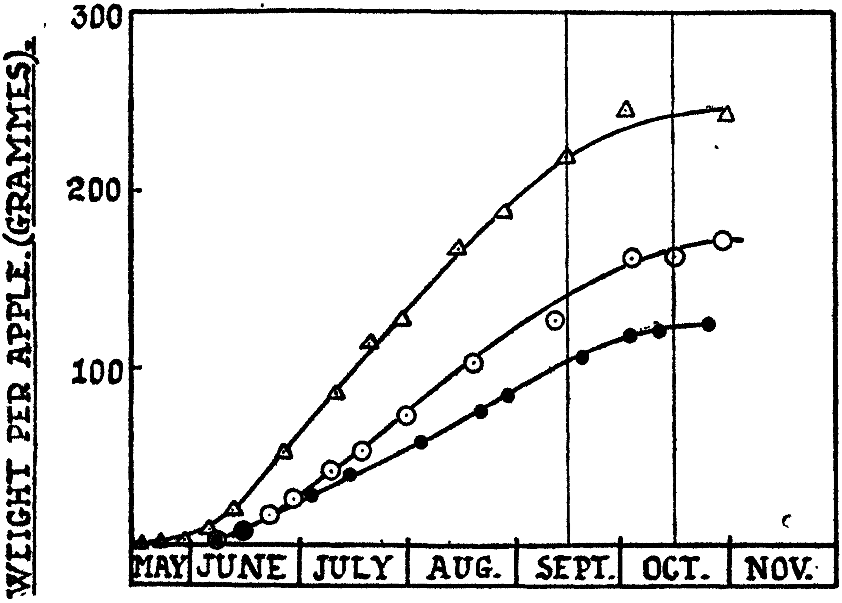

FIG. 2.—INCREASE IN WEIGHT OF APPLE FRUITS.
△ = 1933. ○ = 1934. ● = 1936.
The period during which picking usually takes place is indicated by the two vertical lines (Sept.–Oct.).

Shrivelling and Loss in Weight during Storage

It is generally recognized that immature Apples and Pears are liable to shrivel in storage. They lose water more rapidly than those gathered in a more mature condition. For example, samples of 'Bramley's Seedling' Apples gathered from the same trees on September 29, 1928, and October 29, 1928, were found to have lost 10 and 5 per cent. in weight respectively during five months in storage.

Quality

The term "quality" refers to the characteristic flavour and texture of the fruit and also, in the case of coloured varieties, to the amount of red colour. All the available evidence points to the fact that the longer Apples are allowed to remain on the tree the better their quality will be. It must be remembered, however, that the later the fruit is picked the shorter its potential life, and that even the most efficient method of storage does not stop, but only retards, the ripening processes of the fruit.

Pears intended for storage must be gathered in a hard, green inedible condition. They should be removed from the store before they have reached the eating-ripe stage and allowed to become fully—*i.e.* melting—ripe at ordinary living-room temperatures (60–65° F.). Fruit of the best quality cannot be obtained if it is ripened at too high or at too low a temperature. The importance of this should perhaps be emphasized because it is probable that fruit removed from storage during the winter months will be at temperature too low for the development of optimum quality.

Senescence and Rotting

These two points can be considered together because wastage due to infection by moulds appears to be an index of the degree of senescence of the fruit. In practice it is found that the more mature the fruit when placed in store the more rapidly senescence and rotting develop. Over-mature fruit is softer and therefore more liable to bruising, stem punctures, and other mechanical injuries than less mature fruit.

Development of Functional Diseases

The functional diseases most frequently met with in stored Apples in this country are scald and bitter pit. Although the latter is essentially an orchard trouble, the fact that it may become obvious during storage in fruits that were apparently sound when gathered justifies its inclusion amongst the factors under discussion. Pears are not subject to either of these diseases.

(1) *Scald.*

Scald is a non-parasitic disease which generally occurs as light brown discolorations of the skin of the Apple, affecting in particular the green part of the skin. With continued storage the scald becomes more severe; in other words, the area affected becomes a darker brown until finally the flesh immediately beneath becomes soft and brown. An Apple that has its skin damaged by scald becomes the ready prey of rot-producing moulds.

When no control measures are employed it is found that the earlier Apples are gathered, over the interval under consideration, the more liable they are to scald in storage. For example, in an experiment with 'Bramley's Seedling' Apples it was found that after seven months' storage the value for the percentage of the surface of the fruit that was scalded was approximately 10 per cent. in the case of the fruit that had been placed in storage prior to the climacteric as compared with a value of 2 per cent. for similar fruit that had been stored during the climacteric rise in respiratory activity. Fruit placed in storage after the climacteric showed no scald (Fig. 3).

(2) *Bitter Pit.*

Bitter pit is characterized by sunken spots on the surface of the Apple, which extend into the flesh as brownish areas of dead tissue. Similar areas of dead tissue are frequently present without any external markings so that affected fruits may appear sound until cut open.

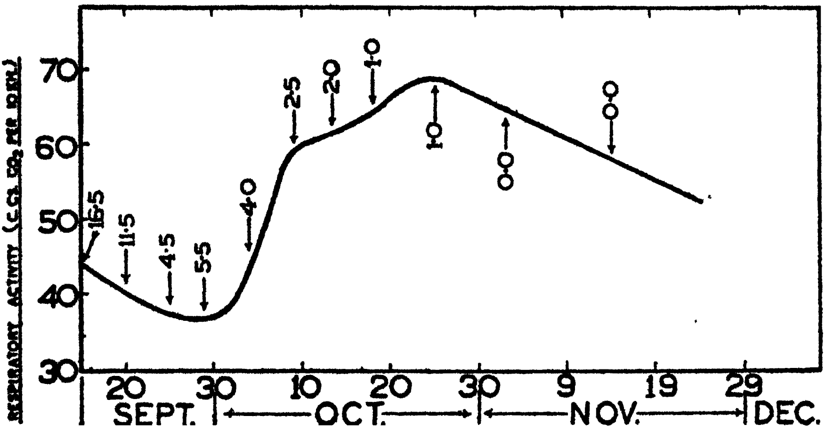

FIG. 3.—DEVELOPMENT OF SCALD IN RELATION TO MATURITY AT THE TIME OF GATHERING. FOR EXPLANATION SEE TEXT. THE CURVE DEPICTS THE RESPIRATORY ACTIVITY AT 54° F. OF 'BRAMLEY'S SEEDLING' APPLES. THE FIGURES ON THE CURVE INDICATE THE PERCENTAGE OF SCALD THAT HAD DEVELOPED BY THE FOLLOWING APRIL ON FRUIT GATHERED AND STORED ON EACH OF THE VARIOUS DATES INDICATED BY THE POSITION OF THE ARROWS ON THE TIME SCALE.

Bitter pit occurs on the tree, but develops in fruit during storage. Investigations in various parts of the world have established the broad fact that late picking and prompt storing help to check this disease. Workers in Australia have demonstrated that early gathered fruit with a high content of starch is more susceptible to bitter pit than late gathered fruit.

To sum up briefly the effects of maturity at picking: it is found that although Apples that are picked too soon may keep the longest, they tend to shrivel, are susceptible to functional disease, particularly bitter pit and scald, and, above all, rarely attain perfection of colour, texture or flavour. On the other hand, if Apples are left on the tree until their characteristic aroma is present and the ground colour of the skin is beginning to turn yellow their life in storage will be relatively short because of the early onset of senescence and rotting. Owing to their softness they will also be more liable to bruising and other mechanical injuries than earlier gathered fruits. It follows then, that a stage between these two extremes should be aimed at. At this stage the fruit can usually be detached from the tree by gently twisting it on its stalk. This test is a very simple one and is far more reliable than the colour of the pips, texture of the flesh or ground colour of the skin

How to Pick and Handle Fruit before Storage

Apples and Pears intended for storage should be clean and sound, that is free from scab, bruises, punctures by insects, rotting, etc.

The fruit should be handled throughout with the utmost care. When it is ready to pick it can generally be separated from the spur merely by lifting it in the hand with or without a slight rotating movement. No leverage should be applied. Inexperienced or careless persons often pull the fruit from its attachment. This usually results either in breaking the spur, which reduces succeeding crops, or in pulling out the stalk of the fruit and exposing the flesh, which opens the way for infection by rot-producing moulds.

Individual fruits should be placed gently in the trays or boxes in which they are to be stored rather than dropped or rolled from baskets or bags.

Fruit picked during warm weather should be allowed to stand in the open overnight, and be placed in the store early and as quickly as possible the following morning, so that full advantage can be taken of the lower temperatures usually prevailing at night.

It is advisable to wrap Apples before placing them in store. Wrappers of any kind reduce the risk of bruising and tend to keep the fruit clean, but those impregnated with odourless mineral oil also minimize the risk of scald.* Experiments with ' Allington Pippin ' and ' Bramley's Seedling ' Apples carried out in 1937–38 by Mr. A. C. PAINTER of the East Malling Research Station showed that with the former variety there was little difference between fruit wrapped in oiled wrappers and fruit wrapped in newspaper. However, both were markedly superior, as regards shrivelling and rotting, to the lot left unwrapped. With ' Bramley's Seedling ' Apples the oiled wrappers gave better results than newspapers (Table I). None of the Apples showed any scald.

In a later experiment with ' Allington Pippin,' in which oiled wrappers, newspaper, and ordinary tissue paper were compared, it was again found that there was little difference between the results with newspaper and oiled wrappers, but that both were better than those obtained with tissue paper.

With Pears the advantages of wrapping are less obvious ; indeed, in the case of varieties with a russety skin the use of oiled wrappers is not to be recommended, because the oil may give the skin an unnatural tint.

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* Supplies of oiled wrappers can be obtained from most shops that sell goods for the garden.

Table I

Effect of wrapping on stored apples

'Allington Pippin.' Stored early October, 1937. Examined January 7, 1938.

Grade and treatment.	Total Apples in box.	Sound or very slightly spotted.	Rots.	Shrivelled.	Remarks.
2½″ to 2¾″ Fancy					
Unwrapped	155	50	84	44*	Shrivelling often severe.
Oiled wraps	155	102	13	25	Shrivelling very slight.
Newspaper (1)	155	106	10	8	Shrivelling very slight.
Newspaper (2)	155	97	12	3	Shrivelling very slight.
2¾″ to 3″ Fancy					
Unwrapped	116	44	56	19*	Shrivelling often severe.
Oiled wraps	116	69	11	6	Shrivelling very slight.
Newspaper (1)	116	72	18	4	Shrivelling very slight.
Newspaper (2)	116	67	15	10	Shrivelling very slight.
'Bramley's Seedling.' Stored early October, 1937. Examined January 28, 1938.					
3¼″ to 3½″ Fancy					
Unwrapped	174	39	74	Nil.	
Oiled wraps	174	72	34	Nil.	
Newspaper	174	46	47	Nil.	

* This number was undoubtedly actually larger, for many of the rots had gone too far to decide whether shrivelling was present.

Orchard boxes holding about a bushel or slatted wooden trays holding about two-thirds of a bushel make suitable containers for Apples or Pears. They are convenient to stack and economical of space. If the quantity of fruit to be stored is small it may be laid out on shelves, preferably in single layers to prevent bruising. This method facilitates periodic examination of the fruit.

Storage Conditions.

As mentioned above, the Apple or Pear is a living, breathing organ in which complex ripening processes are taking place. These ripening processes continue after gathering, and all fruit, no matter how sound and perfect it may be when removed from the tree, will ultimately become senescent and die. The rate of the ripening process depends to a large extent on the temperature at which the fruit is held. This is brought out in Fig. 4, which shows the rate of respiration of 'Bramley's Seedling' Apples at various temperatures, as indicated by the amount of carbon dioxide produced.

It is perhaps not generally realized that a difference of only 1° F. in the average temperature during storage may make a significant difference to the storage life of the fruit. Table II gives the results of an experiment in which part of the crop from a single orchard was distributed amongst a number of unrefrigerated fruit stores in various

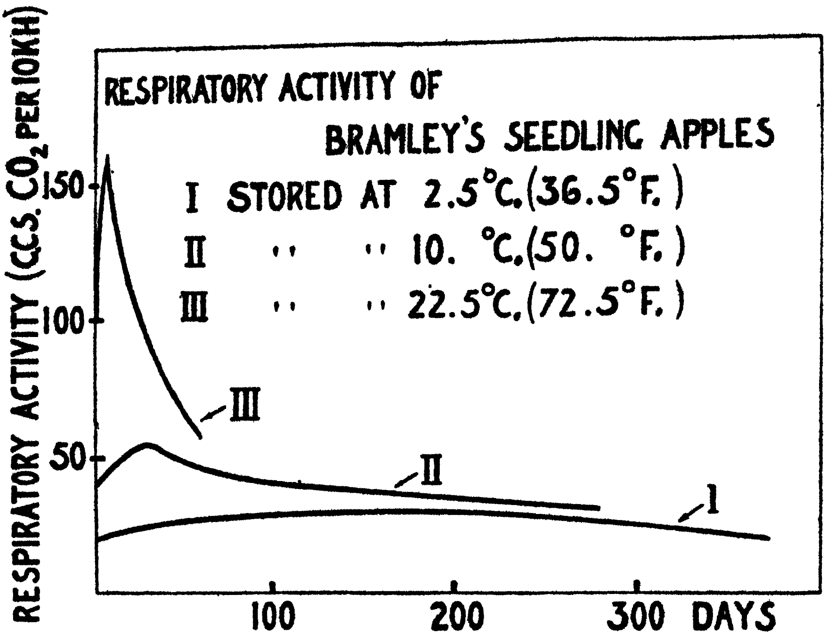


FIG. 4.—THE RELATION TO TEMPERATURE OF THE RESPIRATORY ACTIVITY OF 'BRAMLEY'S SEEDLING' APPLES.

parts of the country. The experimental fruit was placed amongst the other fruit in the store. Records of the temperature in each of the stores were obtained throughout the storage period. After about 4½ months' storage obvious differences in the extent of yellowing and wastage of the experimental fruit were observed. The fruit showing the least wastage was taken from the store in which the lowest average temperature had been maintained, whereas wastage was most severe amongst the fruit taken from the store with the highest average temperature.

TABLE II

Relation of Temperature to Storage Life of Apples ('Bramley's Seedling')

Type of store.	Average temperature (°F.) of store throughout storage period.	Percentage of apples sound on 3rd March, 1946.
Barn Store near Norwich .	41·4	57
" Ventilated " store near Wisbech . . .	41·8	39
Underground concrete-lined store at Chelmsford . .	42·0	42
Semi-insulated store at Cambridge	43·0	29
" Ventilated " store at Little Bognor, Sussex . .	44·2	18

This experiment also indicated that the temperatures obtaining during the autumn in non-refrigerated fruit stores in this country may be higher than those desirable for storage over long periods. It is obvious, therefore, that to obtain the best results some form of mechanical refrigeration is required. Unfortunately, the cost of refrigeration and of a suitable insulated chamber is scarcely justified except in the case of a grower who has many tons of fruit to store. This being the case, it is of the utmost importance that a building or structure should be chosen that will provide a moderately cool, even temperature for the fruit. Moreover, the fullest use should be made of natural conditions in order to achieve this result; in other words, the site selected should be such that the store will be naturally sheltered from the sun either by trees, by being on the north side of sloping ground or against the northern side of another building or, better still, by being below ground level. If the store is below ground level provision should be made for adequate drainage to remove superfluous water.

In addition to a cool, even temperature the following conditions should be provided: (1) ventilation, especially during the first two or three weeks of storage; (2) a fairly moist atmosphere; (3) complete or partial darkness; and (4) protection against mice, rats, birds, etc.

A cool, damp cellar, Anderson shelter, pit made by excavation of sand, gravel or chalk, covered by roofing, or any building that is frost-proof and not liable to heat up quickly should make a good fruit store.

Provision for ventilation should be made by leaving openings under the eaves, which may be filled with straw or sacking during frosty weather, and by providing a door at each end of the building. It is advisable to open the doors and ventilators whenever the temperature inside the store is higher than that in the shade outside, and, *vice versa*, to close them when the outside (shade) temperature is higher than that inside the store.

The humidity of the air in a natural store that is almost completely filled with Apples or Pears is usually high enough for these fruits. If, however, the store is only partly filled with fruit, it is often advisable to increase the humidity by sprinkling water on the floor.

Small-mesh wire netting should be placed over all openings to provide protection against rats, mice and other vermin. Mice in particular can do extensive damage unless adequate precautions are taken.

Apples and Pears should not be stored near anything that is likely to taint them. Fresh paint, tar or any strongly smelling substance may ruin the flavour of the fruit even if it is used for culinary purposes.

An efficient but inexpensive type of store specially designed to take advantage of cool night or day temperatures, is shown diagrammatically in Fig. 5. This store is provided with adjustable ventilators at floor level and in the roof. The walls and the roof of the store are insulated to minimize the risk of heating in warm weather and freezing in cold weather. The floor may be of concrete or earth. A slatted false floor is advantageous since, if the cold air inlets are situated at floor

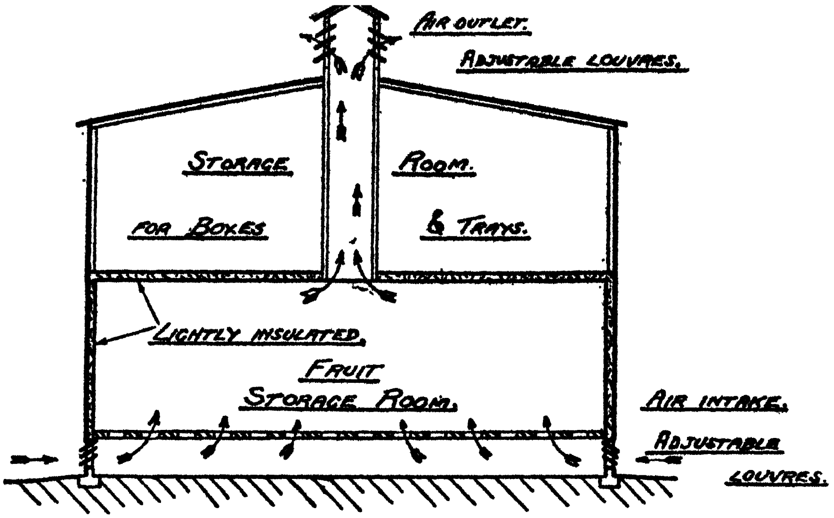


FIG. 5.—DIAGRAMMATIC CROSS-SECTION OF A TYPICAL " VENTILATED " FRUIT STORE, ILLUSTRATING THE PRINCIPLES INVOLVED IN THE VENTILATION SYSTEM.

level, free circulation of air can take place beneath the stack of fruit, and a more even distribution of temperature is likely to result. The system of ventilation depends on the fact that warm air is lighter than cold air. If, therefore, the store contains living fruit which is continuously giving off heat, the air within the store warms up and tends to rise. If this warm air is allowed to escape through a ventilator or ventilators at roof level and fresh air at a lower temperature from outside is allowed to take its place through openings at floor level, the atmosphere within the store will be kept in circulation, resulting in a flow of cool air up through the stack of fruit, carrying away heat from it and thereby lowering its temperature.

The correct procedure is to open the ventilators only when the temperature inside the store is higher than that outside, as indicated by a thermometer shaded from direct sunlight. If ventilation is given when the air outside is much warmer than the fruit, not only will the fruit be warmed up but it may also become covered with a film of water resulting from the passage of the warm air over the surface of the relatively cool fruit. This moisture encourages the development of rot-producing moulds. The efficiency of the store may be increased by the installation of an exhaust fan in the roof ventilator. Whether such an expense is justified by the advantage of better control over ventilation will depend upon individual circumstances.

It will be obvious that the efficiency of a " ventilated " store of this type is limited by the temperature of the outside air, and, as pointed out above, the average temperature prevailing in this country throughout the storage period is likely to be too high for satisfactory storage of Apples and Pears.

An interesting discovery of recent date has been that Apples and Pears during their ripening give off small amounts of volatile substances, other than carbon dioxide and water vapour, which not only stimulate the ripening of less mature fruit but may also cause spotting of the skin. It is therefore inadvisable to store early and late varieties together. For example, 'Cox's Orange Pippin' Apples should not be stored with 'Bramley's Seedling' or 'Laxton's Superb.'

Apples and Pears in storage should be looked over carefully at intervals of about three weeks or a month, and any showing signs of rotting should be removed.

CAMELLIAS AND THEIR CULTURE

By Francis Hanger

(Curator, R.H.S. Gardens, Wisley)

CAMELLIAS at the present time seem to be in greater demand than at any time since the introduction into this country of the first *Camellia japonica* over two hundred years ago. It is no secret that at the moment the demand is much in excess of the available supply, due partly to food production being compulsory in our hardy shrub nurseries during the war years, leaving little time for the propagation of choice flowering trees and shrubs.

Economic necessities caused by high taxation have produced a change from the Victorian formal, artificial gardening (needing endless labour) to the twentieth-century vogue for the far more natural and beautiful type of woodland gardening needing the minimum of labour once the garden is established.

The realization of recent years that *Camellia japonica*, a native of Japan and China (with its many varieties), is undoubtedly hardier than was generally recognized has also created a much greater demand for this family of plants than was the case when Camellias were considered only as plants for the decoration of the mansion or conservatory.

Camellias with their magnificent evergreen foliage lend themselves admirably for woodland gardening in districts free from lime. Preferring a peaty, leafy soil, they also prosper in heavy loam. If available, leafmould or peat added to the heavy soil at planting time will be found beneficial. One word of caution : do not dig a large hole, then place your plant into position and surround it with the peat only. A much better plan is to mix the peat with the surrounding soil before replacement around the ball of your plant. Should the space in the hole immediately near the plant be filled with peat or leafmould only, the Camellia will tend to grow away for a season or so, and then hesitate to develop. This is caused through the roots failing to appreciate and penetrate the surround of heavy or clay soil, after all nourishment has disappeared from the peaty compost.

Good woodland conditions, i.e. a sheltered place where the early morning sun cannot reach, with a slight overhead canopy, is ideal. Such a position would prevent the sun from helping Jack Frost do his mischief in the early mornings during the flowering period.

The slight canopy may give just that covering which makes all the difference between the flowers being touched by frost and their escaping the disfigurement.

Camellias, unlike Rhododendrons, do not require a superabundance of water, provided they are planted in well-trenched ground. Water may be necessary until the plants have become established, after which no further watering should be needed, except under the most extreme conditions. During my eighteen years' experience in the Exbury Gardens many scores of Camellias were planted in the woodlands, some of which have attained fair proportions, quite 15 feet in height and 10 through. I do not remember having to water any of these plants after they had established themselves, not even in the driest of seasons. Planted in a fairly heavy soil, with leafmould incorporated, and top-dressed with some leaf compost, these plants are the picture of health, and they flower profusely annually.

I trust my notes will not be misunderstood and a dry, starved position be chosen to plant Camellias, as I do not wish to advocate such treatment. Should too hot and dry quarters be allocated to this type of plant it would result in a poor, sticky-looking shrub with no vitality to make new annual growths, and form the large flower buds ready to open the following spring.

These woodland shrubs are easy to grow in lime-free soil, yet stress must be laid on the necessity for the correct commencement, i.e. well-drained and well-trenched soil.

To obtain a generous amount of bloom yearly the shrub must be kept growing freely, resulting in that lustrous, shining green foliage so typical of good cultivation.

A sheltered north or north-west wall, which has had generous soil preparations at its foot, makes an ideal home for Camellias; but should such perfect conditions be available preference must be given to those varieties of Camellias which are not quite so hardy as the true *C. japonica*. These should include *C. reticulata*, both the semi-double garden form and the single wild form *C. saluenensis* with its many beautiful hybrids, and *C. taliensis*. If wall space is sufficient, *C. oleifolia*, which flowers in mid-winter, would benefit from the extra protection, and perhaps the *C. japonica* hybrid *C. magnoliaeflora*, as its flowers are easily marked by the weather and it is also the first Camellia to show signs of frost damage (Fig. 25).

Propagation

There are various ways of increasing our stocks of Camellias, and happily the majority of these lovely flowering evergreen plants are comparatively easy to propagate. The garden form of *C. reticulata*, and to a lesser degree the recently introduced wild form of the same

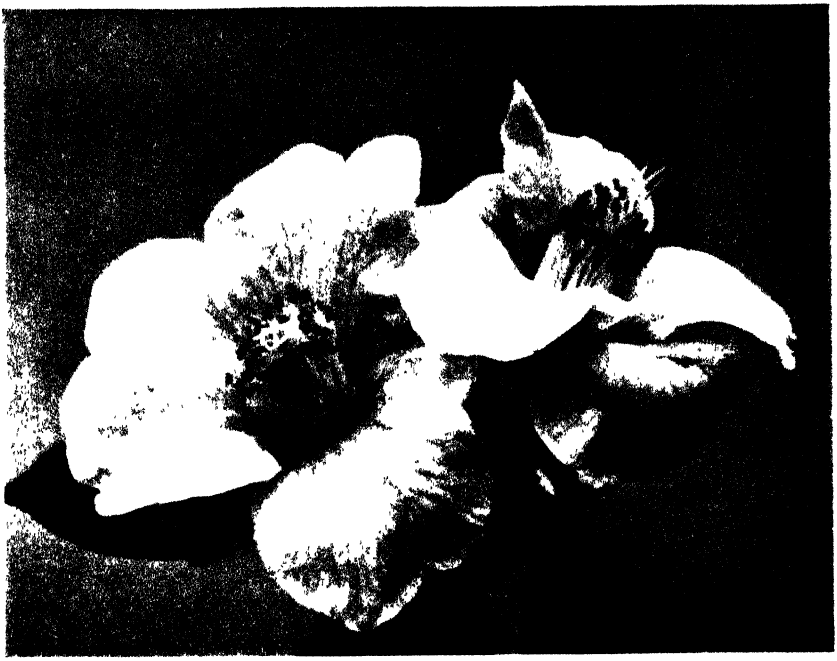
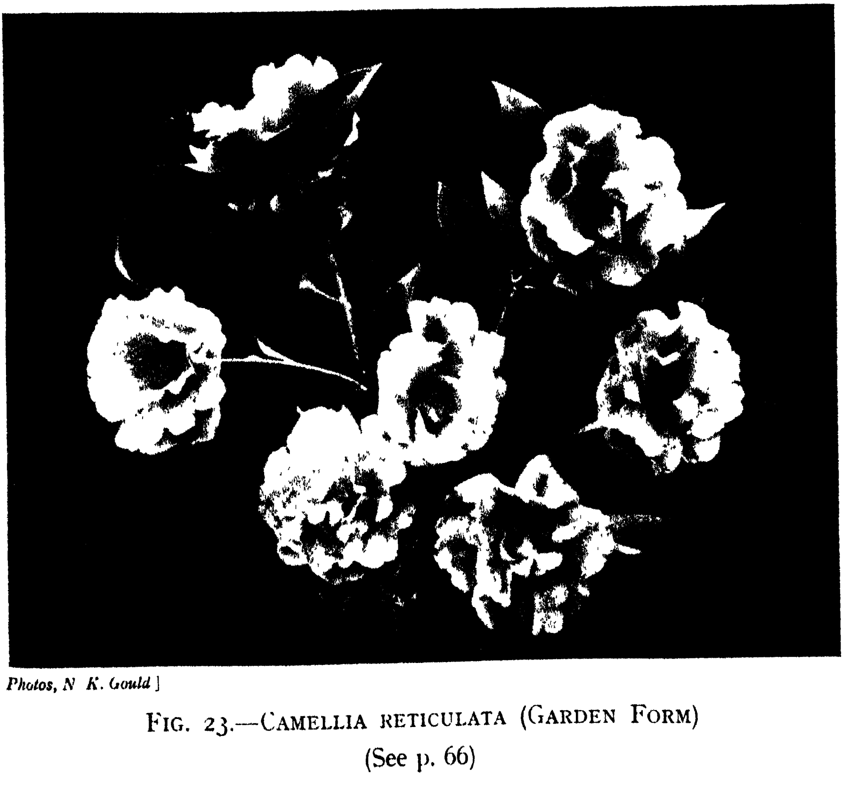


FIG. 22.—CAMELLIA RETICULATA (WILD FORM)
(See p. 66)



Photos, N K. Gould]

FIG. 23.—CAMELLIA RETICULATA (GARDEN FORM)
(See p. 66)

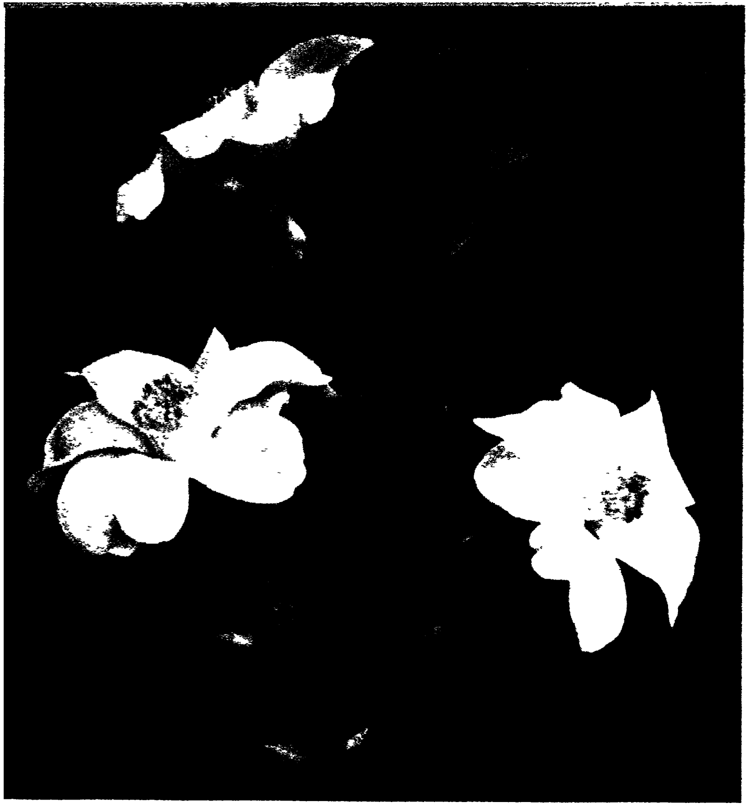


FIG. 24.—CAMELLIA 'J. C. WILLIAMS'

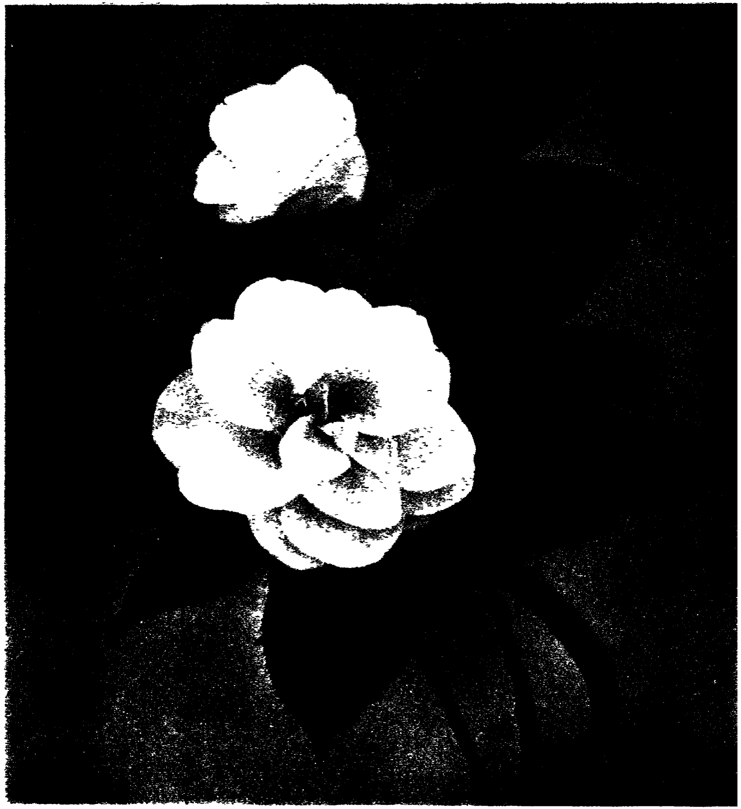
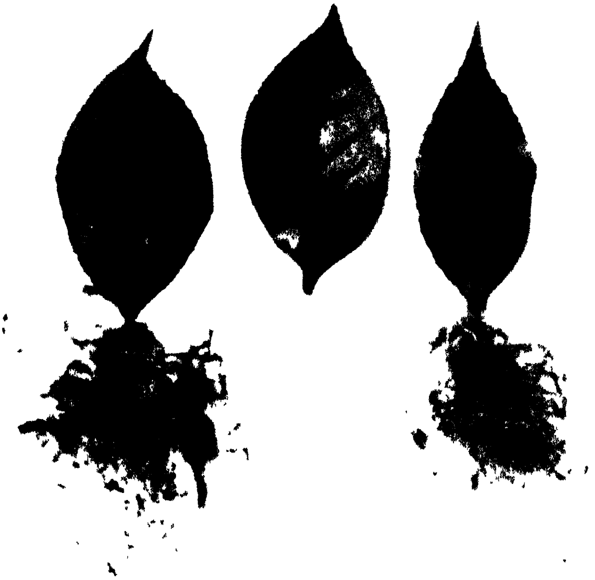
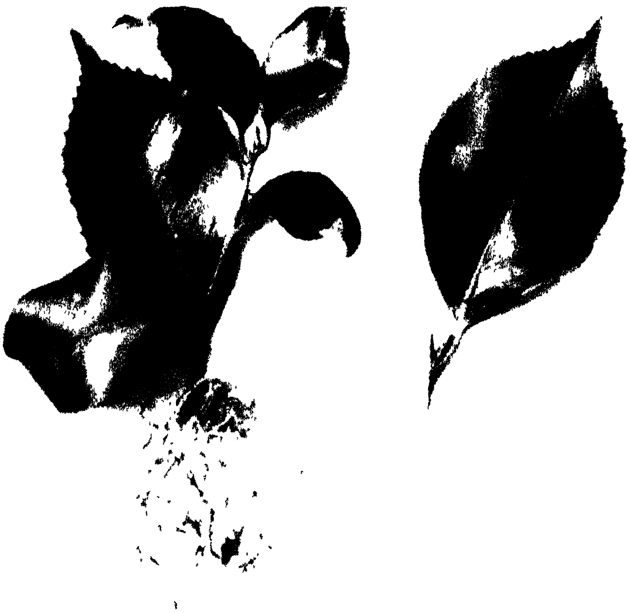


FIG. 25.—CAMELLIA JAPONICA MAGNOLIAEFLORA AT WISLEY





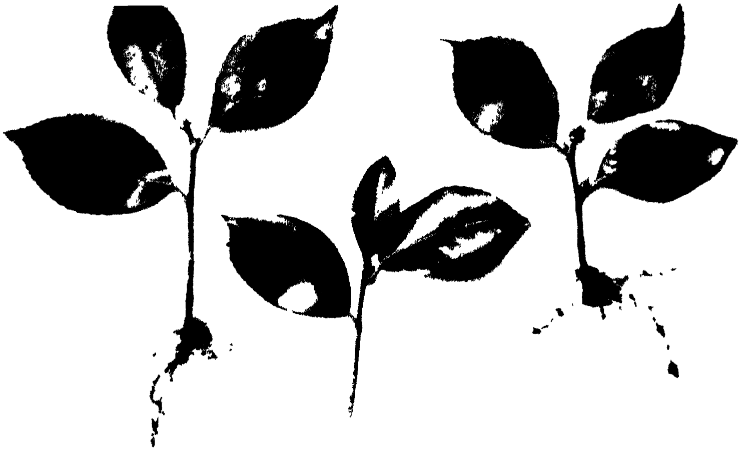
Photos, N. E. Gould

PROPAGATION OF CAMELLIAS

FIG. 26 (top).—ROOTED LEAVES OF CAMELLIA. THESE DO NOT PRODUCE GROWTHS.

FIG. 27. LEAF CUTTING WITH BUD ATTACHED (right) AND ROOTED CUTTING SHOWING GROWTH FROM BUD (left).

(See pp. 62–64)



Photo, N. K. Gould

FIG. 28.—STEM CUTTING AND TWO ROOTED CUTTINGS OF CAMELLIAS
(See pp. 62–64)

VICTORIA MEDAL OF HONOUR, 1946

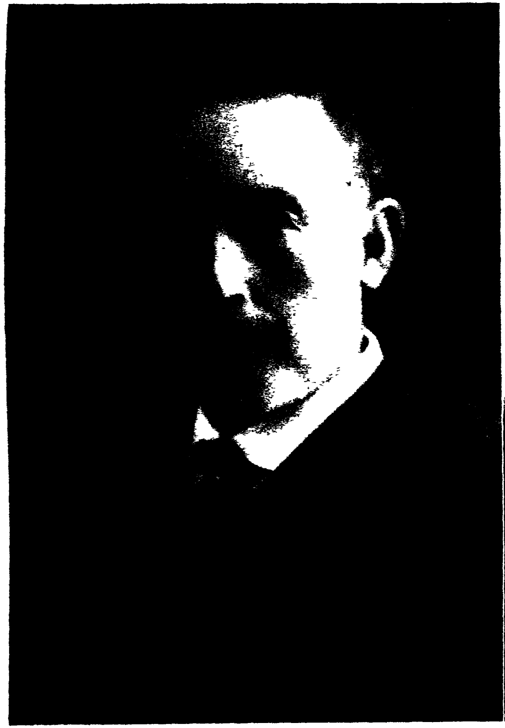


Fig. 30.—Prof. F. E. Weiss, D.Sc., LL.D., F.R.S., F.L.S.

Fig. 31.—Mrs. Vera Higgins, M.A., F.L.S.

Fig. 32.—Mr. Bernard Rochford

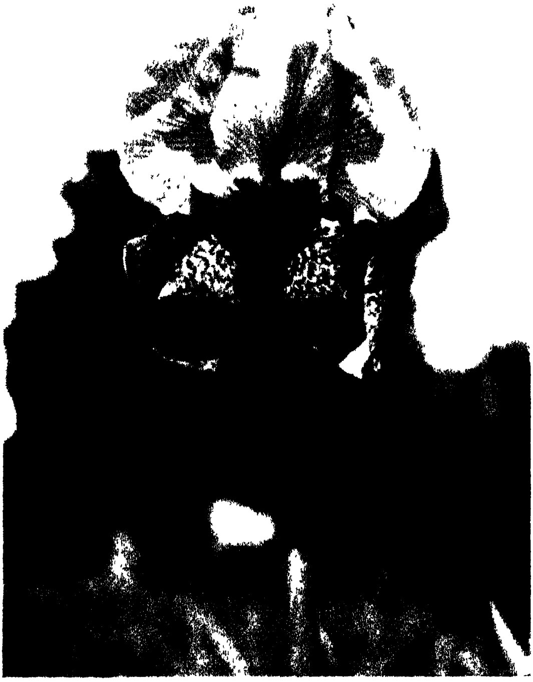
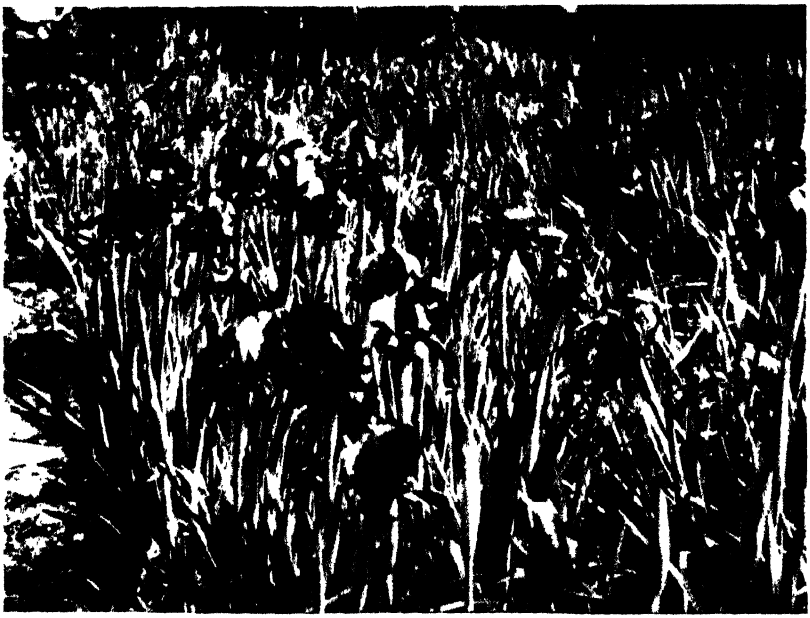


FIG. 33 IRIS HERMONA



Photos, John D Whiting, Jerusalem.]

WILD PLANTS OF PALESTINE

FIG. 34.—IRIS ATROFUSCA

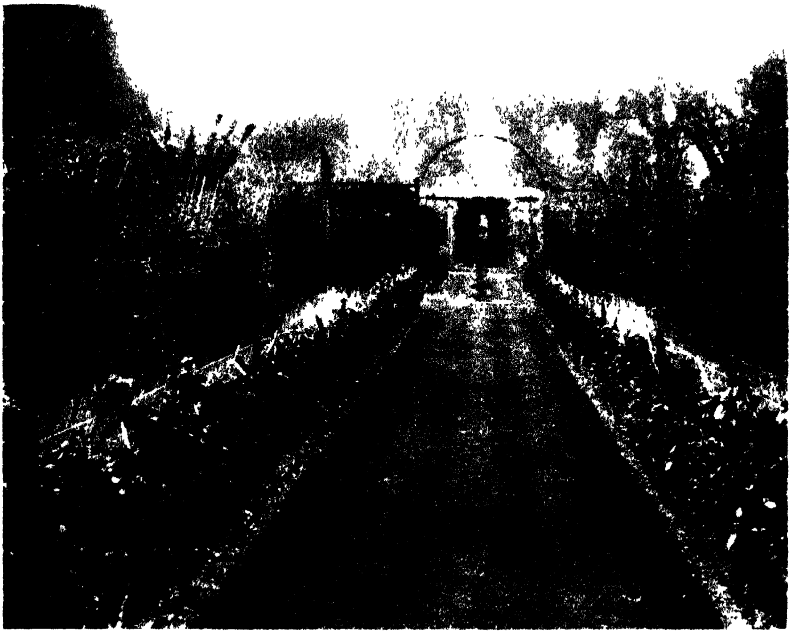


FIG. 35 THE FRENCH FRUIT GARDEN AT FOOT'S CRAY PLACE A FEW YEARS AFTER PLANTING

FIG. 36.- THE FRENCH FRUIT GARDEN AT FOOT'S CRAY PLACE IN 1947

(See p 71)

THE FRENCH FRUIT GARDEN AT FOOT'S CRAY PLACE

Camellia are the exceptions. These plants possess thicker shoots which do not produce roots readily from cuttings.

Seeds

Some of the newly introduced species are becoming quite large shrubs in the more favoured gardens of this country, and during favourable flowering seasons produce good seed. When this is obtainable it provides an easy means of increase, as these species will come more or less true from seed.

With the hybrids it is quite the reverse. Should the seed of these be sown, the grower would not be able to perpetuate his hybrid. The seedlings may be good, bad, or indifferent. Naturally there is a chance of a seedling being an improvement on the parent, and to the adventurous this might make an appeal, but if new and better Camellias are wanted from seed, hybridization is best carried out in a proper manner.

To those who have the time and the inclination, this is a most pleasant form of horticulture, and with the newer species becoming more common, there should be plenty of scope.

I well remember a vist to Caerhays, in Cornwall, many years ago, and having the honour of being conducted round that home of good plants by its then owner, the late Mr. J. C. WILLIAMS. He had scores of Camellia seedlings germinating in short rows outside in a woodland nursery, and he advised me always to sow my Camellia seed in the most acid soil available. Amongst other things he suggested that on my return home I should hybridize certain Camellias, always using a species as one of the parents.

C. oleifolia was to be used as a parent because it possesses such a pleasant scent, hoping to create a race of sweetly scented coloured Camellias.

C. cuspidata was recommended as a plant to produce prodigy of medium size and also be very floriferous.

C. saluenensis had to be hybridized with various single white *C. japonica* hybrids, hoping to obtain a pure white with the good points of *C.* × ' J. C. Williams.'

The wild form of *C. reticulata* was also recommended to be touched up with single forms of *C. japonica* to install a little more hardiness into this beautiful shrub.

Quite a few of these seedling plants are now of flowering size; some are disappointing, but one plant raised from crossing *C. saluenensis* with *C. japonica* × *alba simplex* has produced a pure white Camellia with the good characteristics of *C.* × ' J. C. Williams' and would in every way pass as a white sport of this very fine plant. This newcomer will, I feel sure, make a welcome addition to the many good garden plants to be found amongst the Camellia hybrids.

It is advisable to sow the seed at once as soon as ripe, and should there be a plentiful supply it is best to use seed boxes, but if scarce the seed is best sown singly in small pots. Provide good drainage, and use a good acid mixture, i.e. rich peaty, leafy compost with a little silver sand added. The seed will germinate in the early spring, and speedily make good growth. Those sown singly in pots will be easy to manage as they will only need potting on as required, but the many seedlings growing in the boxes will need early separating, to prevent the many roots becoming entangled. Camellias have very fleshy roots in their young stages and are very easily broken, and should this happen many plants will suffer at potting time, with the possibility of casualties.

Propagation by Cuttings

As already stated, with the exception of the garden and wild forms of *C. reticulata*, Camellias are very easily propagated from cuttings.

This statement is not generally accepted by nurserymen in the trade, many of whom still insist upon grafting as a means of increase, and usually place these lovely shrubs on the market as grafted plants. I feel sure that if time could be devoted to the insertion of the cuttings at the correct time, much less grafting of Camellias would be practised in our nurseries.

Plants grow from cuttings very quickly, and speedily overtake the grafted plant, thus defeating the nurserymen's claim that he must graft to produce a saleable plant in the shortest possible time.

Much has been written on callus formation at the base of Camellia cuttings and the benefits to be gained by paring off the surface of the callus. True it is that root development can be stimulated by this means, but I wish to impress upon readers of this JOURNAL the importance of taking their cuttings at just the correct time, when such cuttings will root easily in eight weeks and no trouble will occur through callus formation.

To obtain the correct type of cuttings the stock plants must be in a good healthy growing condition. From such plants growing in the woodland, good material for cuttings can be obtained during the month of July. At Wisley the third week of the month proved to be the correct time this past year (Fig. 28).

The current year's growth should be taken, when the wood is soft yet not of a flopping softness, and the stem of the shoot is beginning to change from the soft green to the brownish shade of the more matured hardening of the stem. The correct balance of leaf to the cutting is important. Providing the foregoing instructions are carried out the new shoots will have developed three alternate leaves, and if pulled off with a heel attached no trimming will be necessary. The robbing of the parent plant of such cuttings can be overdone, and damage will follow if carried to excess, but with discretion many ideal shoots can be taken and still leave the parent plant in good shape and health. In a nursery all suitable cuttings could be taken from the stock plants, as flowering is a secondary consideration. The plants may then be trimmed up, and left to break again. To root Camellias from cuttings it is not essential to have a heel attached, but I find it an advantage.

Camellias will, it is true, root from cuttings at almost any time of the year; whether they are placed in a frame with bottom heat, in a cold frame or under bell glasses in the open it seems to make little difference to their power of root production. The difference lies in the fact that the softer cuttings taken as advocated and placed in a propagating frame with bottom heat root easily in two months and can be established in small pots before winter sets in.

Later cuttings taken during late September and early October and inserted in cold frames or with bottom heat take up to six months before they are rooted sufficiently to be ready for potting up singly.

Should the wood be very hard the cutting may remain stationary for twelve months or more before throwing roots. It is this hard type of cutting which develops a large callus needing paring; and in such extreme cases as this paring will be found beneficial and helpful in root production. The first principle in obtaining the best results from the propagation of Camellias by cuttings is to obtain good healthy shoots from well-cultivated plants. Without correct material the percentage of rooted plants will definitely be low, but given the right shoots there is no reason at all why one hundred per cent. should not root.

The third week in July has been given as the ideal time for Camellia cuttings for 1946, but it should be recognized that the "right wood" for propagating is not concerned with exact dates. It is very difficult to explain when the wood is just right, the best or perhaps the only possible way must be found by experience. Some men have only to look at or handle the shoot of a shrub to be certain whether it is likely to root or not. The stock plants should be carefully watched, as the correct hardness of the shoot may vary to the extent of several weeks with different seasons, and again different species and even varieties are apt to vary considerably.

I prefer to insert my cuttings in fives around the inside of a large sixty size pot in a mixture of three parts silver sand and one part sorbex peat. Place them in a propagating case with a little bottom heat and maintain a uniform moist atmosphere of 65° to 70°. It is most important to guard against dryness in the pots and the leaves must be kept fresh at all times. Camellias root equally as well in beds of the same compost in the propagating case, and should large numbers of cuttings be available, as when grown commercially, this may be the safest practice, as the beds would not be subject to the danger of rapid fluctuations between dryness and saturation.

However, should only a few hundred be needed the pot method is to be preferred, as the cuttings in the pot can be examined periodically for roots, and when ready taken from the close frame and placed on the bench in the greenhouse. This is a great advantage when the propagator is handling a large number of varieties, as some species root very much quicker than others. These can then be easily removed, leaving those not fit in the frame until ample roots are showing. *C. saluenensis* and its hybrids seem to be the first to root, followed by *C. sasanqua* and closely behind *C. japonica* hybrids. *C. oleifolia* and *C. taliense* need much more time than two months to root, while with *C. reticulata* (wild form) quite four months is necessary. *C. reticulata* (garden form) is most difficult and the percentage of cuttings to root makes the effort most expensive. The writer remembers inserting one hundred well-grown cuttings, only to be successful in rooting eight of this large number.

Propagation by Leaf Cuttings with Bud attached

I have chosen to call this method of propagation by the above title to draw the reader's attention to the difference between just "leaf cuttings" and "leaf with bud attached cuttings."

Camellia leaves severed from the plant by cutting through the petiole will produce roots if given the same treatment as advised for normal cuttings, but although roots develop in abundance I have not to date been successful in obtaining the formation of a bud to produce a growth. The rooted leaves were well established in pots and kept well syringed for over two years. Eventually the leaves died and fell away, leaving the pots of roots only; these were retained for a further considerable period but without success (Fig. 26).

Leaf cuttings with bud attached are the reverse, as in this case the leaf is cut from the plant together with a fully developed growth bud and a thin portion of the stem; these are inserted as normal cuttings and when rooted the bud grows away and forms the new plant (Fig. 27).

These cuttings take longer than true cuttings do in making plants, and this method is only advised where stock is limited, but in such circumstances it is most profitable.

There is a difference of opinion as to the correct or best time to insert this form of cutting. Some successful growers quote October as a suitable month, but the writer considers the following March to be the better season.

This date has several things in its favour. The growth bud is formed in the node of the leaves of the current year's growth. It must be remembered that the bud which is the potential shoot is the most important part of the cutting, and this bud in October is not so fully developed or matured as it would be five months later in March. Again, in October plant life is not so active as in March, when, with the sun gaining power, everything wants to be on the move. This type of cutting then roots quickly and the propagator has a strong bud to throw a growth. Against all this it can of course be argued that October is not such a busy month as March, and there would be far more spare room in the propagating case of a busy nurseryman in the autumn than in the spring.

Before I leave this subject of cuttings I would like to emphasize the need for caution when potting off the rooted plants into small pots, for unless great care is exercised the fleshy roots will easily be broken away from the cutting. This can very simply be done should the soil be pressed too tightly into the pots around the young plant. At Wisley this past autumn quite a considerable batch were potted up, and appeared to be correctly done, but about three weeks afterwards quite a third of the plants withered up and died. On investigation it was proved that during the potting operation the roots had become detached from the cutting.

Grafting and Layering

Although in the commencement of this article I decried the grafting of Camellias I must admit that with *C. reticulata* (garden form) it is an advisable operation if the grower is to get sufficient plants for his purpose.

C. reticulata is, however, not easy to increase by this means and must have first-class attention and craftsmanship to prove successful. I have found it far the best to practise side-grafting for this particular plant, taking pains that the cambium layers of stock and scion join correctly.

Keen observation will be necessary to ascertain the correct time to detach the head of the stock from the grafted plant.

Any common free-growing Camellia plants may be used as stock for grafting. It is not advisable to keep the grafted plants in the propagating case any longer than is necessary to complete the union of the cambiums. As soon as these are satisfactorily united, the plants should be stood out on the bench of the house to harden up the union.

The layering of Camellias is not usually advocated, but this can be done and is a ready means of increase. The shoots to be layered must not be too old and hard, shoots of one and two years' growth only must be used. Pegs will be necessary to form the abrupt turning in the layer to check the flow of sap. With Camellias a sharp twist of the stem to break the bark at the point of the elbow will be beneficial to the rooting of the layer. Some growers consider it advisable to make a snick in the layer with a sharp knife, in the manner as for layering of border Carnations. Camellias are not the easiest of plants to move from the open ground, therefore the layers should have ample roots before transplanting.

Camellia species

C. saluenensis.—This Camellia was first known as *C. speciosa*, and also as *C. Pitardii*, and was shown before the Royal Horticultural Society under the latter name when it received an Award of Merit. Mr. ROBERT LEALY of the Herbarium at Kew has since established its correct name as *C. saluenensis*.

Introduced by the late Mr. GEORGE FORREST this Camellia has since proved to be a first-rate woodland shrub. FORREST discovered it growing at altitudes up to 9,000 feet. In the South of Hampshire large drifts of plants withstood 26° of frost in the winter of 1940–41 with no ill effects. It would no doubt be wise to give this plant the shelter of a north or north-west wall in less favoured parts of England. In bloom from late February, through March until well into April, this early flowering shrub is apt to be spoilt by the early spring frosts, but other buds soon brave the weather to adorn the woodland with their soft pink, dog rose-like flowers. The five-petalled blossoms are enhanced by their centres of rich yellow stamens. *C. saluenensis* makes a rather thin evergreen shrub if left to grow naturally and may need a little support. This failing is easily remedied in the young stage by judicious stopping or slight pruning. During seasons free from spring frosts this Camellia sets seed abundantly and carries various size seedpods up to one and a half inch in diameter, containing large seed, never more than seven but mostly in threes or fours.

The late Mr. J. C. WILLIAMS used this Camellia for hybridization, with most happy results. Crossing it with a single pink *C. japonica* he has presented us with that loveliest of Camellias now named *C.* × 'J. C. Williams.' Not only are the flowers more freely borne than those of *C. saluenensis*, but they are larger, and perhaps deeper pink in colour; yet most important of all the introduction of *C. japonica* blood into this plant has made the hybrid more hardy than *C. saluenensis*. At Wisley there is a plant growing in a very open part of Battleston with very little shelter, now 4 feet high, in perfect condition. It has withstood a ground frost of 2° below zero without being damaged (Fig. 24).

Another hybrid of the same parentage from the same source, and just as desirable, is *C.* × 'Mary Christian,' which has the same habit but darker pink flowers. There are various coloured forms of *C. saluenensis*.

C. reticulata (garden form).—This is probably the most magnificent of all Camellias, with quite five-inch semi-double deep rose flowers which are hardly surpassable for beauty by any other hardy flowering shrub. No doubt the using of the word hardy is disputable, yet I know of a group of this Camellia planted in the woodland of a Hampshire garden which has prospered and flowered freely each year since it was planted twenty-five years ago. The planting is now twelve feet in height and thirty feet through, and when in flower is a revelation for those fortunate enough to see it (Fig. 23).

C. reticulata (wild form).—Another of the late Mr. G. FORREST'S introductions, this shrub has single rose-red flowers about three to four inches across and the petals vary in number from five to eight. The usually solitary flowers open during March and April at the apex of the previous year's growth. This Camellia flowers much more sparingly than *C. saluenensis*, and it is less free in habit of growth but has far more rigidity. The leaves, however, are much larger, and when the plant is in good health they are up to four inches in length and two wide. This shrub has the appearance of making quite a small tree, the largest of a plantation known to the writer being eight feet high in the woodland after twelve years in the open (Fig. 22).

C. taliensis.—FORREST sent this Camellia to us under number F. 29960 Thea. sp. The plant is rare in this country; the only known plants are two at Kew about four feet high grafted on *C. japonica* stocks and two rooted cuttings at Wisley. A plant was raised at Exbury from FORREST'S 1931 sending and duly planted in the large Rhododendron house, where it flowered for several years. Recently it has been necessary to remove the shrub, which by that time had become quite fourteen feet high. *C. taliensis* has much softer-looking leaves than most Camellias, almost olive-green in colour. When fully developed these are fully five inches in length. The two-inch white flowers have an outer ring of five wide petals and an inner ring of five smaller and narrower ones. The yellow stamens are very numerous and project from the centre of the flower nearly three-quarters of an inch. The flower buds form in the axils of the leaves along the whole length of the current year's growth, seldom solitary, mostly in twos and threes. These buds are perfectly round, and when the size of green peas are pure white, and continue to remain the same colour while increasing in size until they are approximately as large as an edible cherry. These white buds greatly add to the attractiveness of the shrub over its flowering season, commencing in September and lasting well into December. The hardiness of this Camellia has not been proven, but I consider it worthy of trial on a favourable wall as soon as stocks permit.

C. oleifolia.—This sweet-scented Camellia from China has been very scarce in this country, but of recent years quite a number of younger plants are being distributed. In normal seasons this shrub is in bloom throughout the month of January, but in the extreme south of England the writer has often used sprays of flowers from this Camellia for Christmas decoration. Its blooms are quite pink when in bud, and the outer petals retain this pinkness when open, giving the impression of Apple-blossom. Almost semi-double in their makeup the flowers have inner petals which are perfectly white. The nearly three-inch blossoms appear singly towards the apex of the season's growth and their sweet scent is an added charm. When fully open the blossoms become quite flat, exhibiting the central clusters of golden stamens to perfection. *C. oleifolia* has rich, shining serrated leaves varying up to three inches in length by one and a quarter in width. My experience has taught me that this plant rivals *C. sasanqua* for hardiness, and could be described as a glorified free-flowering " variant " of that Camellia.

C. sasanqua is quite hardy at Kew, and blooms from November onwards. The white flowers of the true plant are small and single, but there are garden forms with much larger blooms ranging from pure white through the pinks to almost red in colour. Most of these better coloured forms have been introduced from Japan and seem more willing to flower than the true *C. sasanqua.* This hardy Camellia is very easy to raise from cuttings, and it is hoped that the better garden forms will speedily be made available for the public.

C. cuspidata is perhaps the latest of the Camellias to come into bloom in the spring. Perfectly hardy, this plant has much smaller leaves than most members of this family of plants. Its small white flowers are very freely produced. A native of West China, it was introduced by WILSON. Hybridized with *C. saluenense* it has produced various small-leafed hybrids. The Wisley plant has flowers a little larger than *C. cuspidata,* but with an appreciable shade of pink in the white petals.

C. maliflora, a double flower species, has of course been grown in this country for well over one hundred years. Although it grows well outside, to see it at its best, one has to visit the temperate house at Kew, where the large bush displays the small double pink blooms to perfection.

C. hongkongensis, coming from Hong Kong, may not be hardy in this country. I know very little about this plant. While at Exbury the only plant there was one received from Kew, and I had it grown in a warm greenhouse, hoping to see it flower, but to date there are no flower buds.

C. sinensis, the tea plant, does not cheer our hearts with the beauty of its flowers and is not of great value as a flowering shrub, but it is of course very welcome to English people everywhere when its dry leaves are brewed and the beverage drunk as a national drink.

C. japonica.—It only remains for the writer to mention this last species with its lovely glossy leaves and its single red flowers. This Camellia is so well known and has been described so many times that it is hardly necessary to do so again. Suffice to state that the plant and its scores of varieties are considered first-class hardy flowering shrubs for the woodland garden. There are many with different coloured single and double flowers, from pure white through all shades of pink to rose, and red, scarlet to crimson, together with the many bicolor forms.

It is correct that everyone should not agree on the beauty or charm of the various colours or forms of flowers, therefore I do not propose to give a long list of my own likes or dislikes of these charming Camellias, but rather leave it to the readers of this JOURNAL to visit the Royal Horticultural Society's Shows at Vincent Square, and make their own choice from those nurserymen who exhibit and specialize in this type of plant.

SOME WILD PLANTS OF PALESTINE AND THE PROBLEMS OF INTRODUCING THEM AS GARDEN PLANTS

By Dr. Elisabeth Boyko
(Jerusalem)

THE very interesting article by P. H. DAVIS in the April, 1946, number of the JOURNAL prompts me to bring out some of the problems met here when the cultivation and propagation for export of Irises and other bulbous and tuberous plants is attempted. The extraordinary beauty of many Palestinian wild plants is a challenge to every devoted gardener who wants to share such beauty with garden-lovers of other countries, yet the difficulties of cultivating them do not seem easy to overcome.

I shall first give some idea of the work already begun here, sketchy though it is, on Irises and, further, mention a number of bulbous and tuberous plants, some of which have been tried, and others which are worth trying out for introduction into gardens.

When we wish to introduce any cultivated plant into a new area, we study carefully the natural conditions of the original location and take notes of the soil qualities, climate, geographical distribution, peculiarities of the neighbourhood, seasons, etc. When introducing a wild plant into another area, imponderables are sometimes met, such as when a specimen, for no apparent reason, chooses to prosper in a single very restricted area, but when transferred to a seemingly similar place does not flourish. Then the gardener—and this is the case with Irises in Palestine—has to fall back on experimenting, and with the help of physiological, chemical and even bacteriological or mycological research workers, has to try to solve the problem and create the conditions necessary for the successful transfer of the plant into the new surroundings.

There are great individual differences in the adaptability of plants in these matters, just as there is a wide or narrow geographical distribution for different plants in nature. The original area of some Irises is often queerly restricted, sometimes covering a medium-sized mountain, as in the case of *Iris Haynei* Bak. on Mount Gilboa, or a few single clay beds, or depressions in basaltic rocks. Transplanting for the sake of cultivation and propagation has so far been done here in rather a haphazard way by amateurs and gardeners, though occasionally, as with the species *Iris atrofusca* Bak., it has been successful (Fig. 34). But mostly, results have been poor from the start or, after a first lucky transfer resulting in a good bloom in the first year, plants have either died off wholesale or gone back in bloom, so that plots that gave 80–100 blooms at first produce some 5–10 poor specimens. In some cases the colouring also seems to fade, so that a group of naturally blue Irises may produce pale lavender blossoms when transferred. In such cases, where the mineral soil content of the substratum is probably responsible for the colouring, a chemical soil test is essential, and comparative studies with samples of the new places may lead to discovery of the deficiency.

Another important point for the growing of Irises in gardens seems to be the lifting of the tubers. As most of these tuberous plants prevail in the semi-arid zones of Palestine and Transjordan and consequently have a dry rest period of several (6–8!) months, the gardener naturally cannot transfer these same conditions into his garden unless he sets this whole group definitely apart from the other plants, which are given irrigation throughout the summer. Some experiments in Palestine now seem to indicate the lifting of the tubers should be done some six weeks after blossoming, and that the maturing should take place in a well-aired shelter. The gardener who had been specializing on Irises emphasized that the tubers were less resistant against attacks of fungi, bacteria, etc., in the rest period than in the growing period. It must be made clear, though, that all experiments here have been done by individual gardeners, so far without co-operation and without control plots, and they have relied on their natural feeling for cultivation more than anything else. Scientific exactness has been lacking, so even successful experiments have been made by chance.

It seems to me that the cultivator who wants to achieve practical results will have to work systematically to introduce wild plants into cultivated plots, so I give below some suggestions as to how these experiments should be tackled. Palestine itself would be an excellent place for these investigations, owing to its research possibilities and the facility with which fresh material may be received on the spot and natural growing conditions, soil material, etc., be checked. Only after having achieved results in Palestine would the second step be taken, to try them out under parallel conditions elsewhere and see if they stand the test:

(1) Plant according to the natural site, whether in sandy, loamy, basaltic or clay soils, with reference to the mineral soil composition of the natural area.

(2) Plant at different levels below the soil surface.

(3) Lift at varying intervals after flowering and checking by plots, with no lifting in the rest period.

(4) Store at different temperatures and soil moistures.

(5) Replant at different times before the rains, with or without initial irrigation.

It is to be hoped that experiments on these lines will be carried out in Palestine in the near future, for the enrichment of horticulture all over the world. This work should not be restricted to Irises alone. To take only bulbous and tuberous plants into account, I should like to mention a number of other wild plants, indigenous to Palestine, which are worth cultivating in gardens.

Anemone coronaria L. (Garden Anemone) in various bright colours.
Allium spp.
Arum Dioscoridis Sibth. et Sm. (spotted Arum).
Arum palaestinum Boiss. (Palestine Arum, black Calla).
Cyclamen persicum Mill. (Aleppo Cyclamen).
Crocus hyemalis Boiss. et Bl. (Winter Crocus).
Crocus ochroleucus Boiss. et Gaill. (Cream coloured Crocus).
Gladiolus aleppicus Boiss. (Corn Flag).
Gladiolus segetum Ker-Gawl.
Ixiolirion montanum Herb. (Mountain Lily).
Narcissus Tazetta L. (Tazetta Narcissus) (Polyanthus Daffodil).
Ornithogalum arabicum (Great-flowered Star of Bethlehem).
Ornithogalum narbonense L. (Spiked Star of Bethlehem).
Pancratium maritimum L. (Sea Daffodil).
Ranunculus asiaticus L. (Persian Crawfoot).
Scilla hyazinthoides L. (Hyacinth Squill).
Serapias vomeracea (Burm.) Briq. (Toung-flowered Orchid).
Sternbergia aurantiaca Dinsm. (Golden Sternbergia).
Sternbergia colchiciflora Waldst. et Kit. (Colchicum-Flowered Sternbergia.
Sternbergia macrantha I. Gay. (Large-flowered Sternbergia).
Tulipa oculus solis St. Amas (Sun's Eye Tulip).
Tulipa praecox Ten. (wide-leaved Tulip).
Tulipa sharonensis Dinsm. (Sharon Tulip).

I mentioned only Palestinian plants ; the list could be much enlarged if in addition the neighbouring countries would be combed for outstanding wild flowers as well.

THE FRENCH FRUIT GARDEN AT FOOT'S CRAY PLACE

By N. B. Bagenal, Wye College, Kent.

IN *The Art and Craft of Garden Making*, the late Mr. THOMAS MAWSON describes how, in 1900 or thereabouts, he was called in by Mr. S. J. WARING, afterwards Lord WARING, to lay out the gardens and grounds of the classic renaissance mansion at Foot's Cray. The house had long been unoccupied and had been doomed to partial destruction as part of a plan to cut up the estate into building plots.*

As part of the general decoration it was decided to lay out a Fruit Garden on the model of a similar garden in France, and MM. CROUX ET FILS, the famous nursery firm of Chatenay, undertook to plan the layout and supply the trees under a contract which provided for the replacement of any that died within the first year.

Thanks to the retentive memory of Mr. JAMES B. WALKER, who as a member of Mr. MAWSON's staff supervised the planting, it is possible to give the following particulars of the remarkable fruit garden that members of the Fruit Group visited in August 1945.

A plan of the old kitchen garden, showing the elevation of the surrounding walls, was sent to MM. CROUX, who prepared a detailed plan showing the exact position to be occupied by each tree. The construction of the oak paling or espalier work against which the trees were to be trained was carried out here by GARDEN CRAFTS LTD., under Mr. WALKER's direction, the actual spacing of the wires being left to the Frenchmen who brought over a number of wooden laths to which the branches of the trees were tied. The trees came over in the early spring of 1905. They were already fully trained to their different shapes, which were of all sorts and sizes, and included Apples, Pears, Plums and Cherries, but mainly Apples and Pears.† The trees were packed in hampers and crates, and protected with stakes, straw, and Russian mats. For the planting, large holes were dug, the bottom of each hole being filled in with brick and old rubble. A large heap of rotten turf and leaf mould had been prepared and mixed. The Frenchmen did the actual spreading out of the roots and the planting, and Mr. WALKER remarks that they appeared to take more care over the job than he had ever seen taken in this country before. And all

* The news that the house and estate have again been saved from a similar fate gives hope that these remarkable examples of successful garden design may continue to give pleasure to all students and amateurs of landscape architecture for many years to come.

† From their present appearance it seems clear that Cherries and Plums do not take kindly to such drastic treatment.

this care seems to have been justified, because Mr. WALKER noted in his diary for January 1906, that when he inspected the trees with Monsieur JEAN, the French gardener, whose task it was to come over yearly to superintend the pruning, only ten trees had died, and these were replaced. As the majority of the trees would have taken not less than five years from the bud to reach the many odd shapes for which they were intended, it is safe to assume that most of those the Fruit Group looked at were getting on for forty-five years of age.

As will be seen from the illustrations, tree shapes included nearly the full range, from the sublime Lyre on one wall to the ridiculous standard Balloons that appear to be designed for the sole convenience of nesting birds (Fig. 37). The Table and Chair are there in duplicate and good preservation, but 1905 was a little early for the Bicycle which at a slightly later date became such a feature of the Luxembourg Gardens.

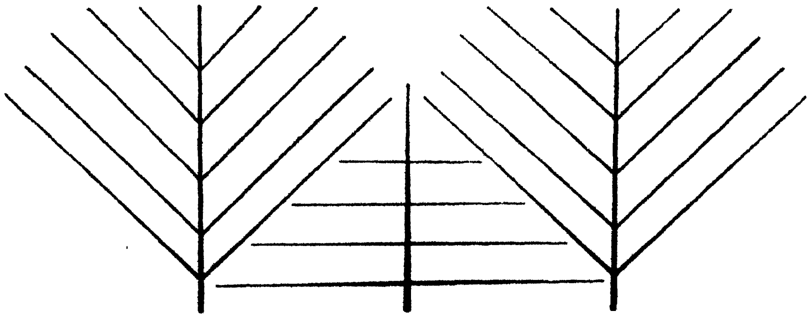


FIG. 1.—FORME COSSONET.

The multiplicity of shapes makes the garden a little too much of a museum, and a little too fantastic to be an unmixed pleasure to the eye. At the same time it will be admitted that certain of the shapes, especially the Palmettes and the true Candelabra, the Lozenge, and the inarched horizontal Cordons, edging the garden paths, are objects that please the eye by their symmetry of shape and trim formality in winter, even more perhaps than by the fruits which are supposed to be their end products. The Winged Pyramid, that miracle of the grafter's art, stands about the garden, transfixed in an attitude of graceful discomfort that at once attracts and repels the gaze, as though it were something that man has achieved in the very teeth of Nature (Fig. 38). Then, too, there is the sensible and curiously beautiful double form known in France as Forme Cossonet, a neat method of ensuring that all available space on wall or fence is fully furnished. This consists of what the French call Palmette Horizontale, our espalier, flanked on either side by their Palmette Oblique which we would call a Fan with Central Leader. (See Fig. 1.)

There is no doubt that one or two trees of these elaborate shapes may prove of absorbing interest to manipulate, and might in addition provide a much-needed focal point in the fruit garden at all times, but especially in winter when the shape can be fully appreciated.

But what strikes the observer with most force about these old trees is how well-preserved they look. This is due in large part to the loving care of the Head Gardener, Mr. Sharp, who has looked after them so carefully for so long. But what is so surprising is to discover from the testimony of the suckers, that occasionally can be seen beside a tree, that the Pears are mainly worked on Quince, and at least some of the Apples are on Doucin Amelioré, M.5. This is all the more surprising in view of the fact that it has always been understood in this country that, if you are going to make a Pear into a trained tree, you must work it on Pear stock, and similarly, for the same purpose, that an Apple should go on something really vigorous. The trees were fruiting quite well last summer, and Mr. Sharp reports favourably on their cropping in past years, and adds that there has not been an excessive amount of annual shoot growth to cut away, as is so often the case with garden trees. This combination of moderate growth with regular cropping may be due to the fact that the trees do not appear to be worked on over-vigorous rootstocks, but the moderating influence of the twisting and turning of the shoots to form the artificial shape must not be forgotten.

Members of the Fruit Group who visited the Garden may remember a row of remarkably fine standard Apple trees in the Park. It appears, from the plans of the layout printed in Mr. Mawson's book as examples of Garden Design, that these must be all that remain of what was once called the Apple Grove, consisting of four rows. Mr. Walker himself selected these trees from English nurseries, and planted them in 1904. Whatever their reactions may have been to the coming of their French rivals the following year, time must by now have established an *entente cordiale*. Long may the two sets of tree continue to typify their respective countries in this admirable manner.*

NOTES FROM FELLOWS

Cypripedium hirsutissimum as an epiphyte

During May of this year, while on tour in the Naga Hills of Assam, I was passing through a stretch of primary forest, when I noticed a large growth of an epiphyte on the trunk of a tree. On closer investigation, I was not a little surprised to find that it consisted entirely of *Cypripedium hirsutissimum*, growing in tufts from ground level up the vertical trunk to a height of fifteen or twenty feet (Fig. 29).

The plants were in full bloom, and presented a charming picture, the great flowers, six inches across, and tipped with glowing rose-purple, contrasting with the glaucous-green of the leaves, and the dark brown of the tree trunk. Some plants had twelve or more flowers out together. There were plants in every stage of growth, from small seedlings to large clumps; and the colony had every appearance of being on the increase. I collected an armful of plants without making any appreciable difference. A curious point was the complete absence of any plants on the floor of the forest round about, although it seemed well suited for *Cypripediums*.

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* Detailed instructions for shaping and pruning most of the "forms" of tree found at Foot's Cray are given in the classical French text book on pruning, *La Taille*, by Hardy.

I questioned the Nagas who were with me; they assured me that they knew the plant well, and that it usually grew on rocks in the jungle, and that this was the only time they had seen it as an epiphyte. They also added that Professor J. H. HUTTON (formerly Deputy Commissioner of the Naga Hills) had collected plants off the same tree at least fifteen years ago. Since Nagas have proverbially long and accurate memories, I am inclined to accept their statement.

The altitude was approximately three thousand feet. In the same area I recently found a pure white variety of the *Vanda coerulea*.

C. R. STONOR.

Old Carnations and Pinks, an Additional Note

An interesting old Pink which has been and is still in cultivation is the Cheddar Pink, which was known in the seventeenth and the earlier part of the eighteenth century as the Mountain Pink; it grows to a height of about six inches and is a native of the mountainous district of the Cheddar Gorge (Somerset). A writer in 1727 speaks about this plant, which he saw and gathered at Cheddar Gorge. He describes the Pink as " growing in crevices in the rocks at a considerable distance from the ground."

Interest in the Laced Pinks is growing, but there appears to be some doubt regarding the origin of this type of Pink. Of course the Pink with an eye is very old and no doubt there were examples of this type of Pink in the wonderful collection of Pinks grown by Queen HENRIETTA MARIA, wife of CHARLES I. The single form of the ' Pheasant's Eye ' is shown on a portrait dated 1671; a lady holds two of these flowers in her hand. By about 1750 Laced Pinks were to be found in English gardens with a narrow border of colour of the same shade as the eye, but it was not until about 1770, when the Lancashire weavers took up the cultivation of this type of Pink, that the Laced Pink attained the perfection which was so much admired during the latter years of the eighteenth and first half of the nineteenth century. About the same time as the Lancashire weavers were cultivating the Laced Pinks the weavers at Paisley in Scotland took up the cultivation of the Pink with an eye—a circular bank of colour encircling the centre of the flower such as the ' Pheasant's Eye ' and ' Musgrave Pink.' These two were propagated and became florist flowers. The petals were always white with a dark eye and are known to-day as black and white Pinks. For some years it was believed that this type of Pink was extinct, but Mr. G. M. TAYLOR, the well-known Scottish horticulturist, has rescued several of these plants from old gardens in Scotland.

RICHARD COB, a nurseryman living near London in the eighteenth century, raised a number of miniature forms of well-known garden Pinks of which the only survivor to-day appears to be the 'Paddington Cob,' which is a miniature variety of the single 'Pheasant's Eye Pink.'

GRACE GLADWIN.

PLANTS TO WHICH AWARDS HAVE BEEN MADE IN 1946

Hoheria glabrata. F.C.C. July 16, 1946. A very beautiful, deciduous shrub or small tree, native to New Zealand and occurring in the western ranges of the Southern Alps. It is of rapid growth, soon forming a tall, shapely bush with many slender, spreading branches bearing ovate, acuminate, irregularly crenate-serrate and finely pubescent pale green leaves, 3 to 5 inches long. The lovely white, Cherry-like flowers, each nearly 1½ inch across, are borne in pendulous axillary clusters of three to seven. Some confusion exists in horticultural literature between this and *Hoheria Lyallii* (otherwise known as *H. ribifolia*), a plant with silvery hairy leaves and later flowers which has a more easterly distribution in drier mountain districts of New Zealand. Exhibited by the Director, R.H.S. Gardens, Wisley. (See p. lxiv, vol. LXXI.)

Ourisia microphylla. A.M. June 18, 1946. A cliff-dwelling alpine plant from the Argentine, introduced by Mr. H. F. Comber in 1925–26, forming prostrate tufts resembling some species of *Cassiope*. The minute lanceolate leaves overlap like those of *Cupressus*; the flowers are borne in the leaf axils at the ends of the shoots, each ½ inch in diameter, Rhodamine Pink (H.C.C. 527 to 527/1) with a white throat, the tube ½ inch long, glandular like the sepals and pedicels. Exhibited by Dr. P. L. Giuseppi, Felixstowe. (See p. lx, vol. LXXI.)

Paeony 'Orion' F.C.C. June 18, 1946, as a hardy herbaceous plant. This outstanding Paeony received an **A.M.** on June 21, 1927. It is a seedling from an imported variety named 'Emperor.' It is free flowering in habit and grows 4½ feet high. The single flowers are fully 6 inches across and come near Indian Lake in colour (H.C.C. 826) with a central mass of crimson tinted petaloid stamens tipped with golden anthers. Shown by W. B. Cranfield, Esq., V.M.H., Enfield Chase, Middlesex. (See p. lviii, vol. LXXI.)

Prunus Persica 'Palace Peach.' A.M. March 26, 1946. The flowers of this new double Peach are just under an inch across, and are made up of twelve to fifteen petals of an unusually dark colour, matching the Chrysanthemum Crimson of the Colour Chart (824/3). Exhibited by Messrs. L. R. Russell, Ltd., Windlesham. (See p. xl, vol. LXXI and p. viii, vol. LXXII.)

BOOK REVIEWS

"The Apples of England." By Dr. H. V. Taylor, O.B E. Third Edition. (Crosby Lockwood & Son, Ltd.) 30*s*.

That it has been found necessary to publish a third edition of this useful book is undoubted evidence of its meeting a definite demand. There is an urge on the part of all those interested in Apple growing to know more about the subject. Owing probably in some measure to the difficulty of obtaining supplies of good fruit, interest in the growing of Apples has become intensified during recent years. The Apple is always looked upon as essentially a British fruit. This is emphasized by the large numbers of varieties that have for so long been grown in the British Isles.

As Dr. Taylor says in his foreword to this third edition, "Little alteration of the written material has been found necessary and no major changes have been made." In a work of this sort it is almost inevitable that there will be descriptive details about certain varieties with which many individual growers will not agree; and the inclusion of some varieties recommended as useful for gardens will by no means coincide with the views of all Apple enthusiasts. For instance, 'Gascoyne's Scarlet' is stated to be poor except on chalky soils, but we have grown this variety for many years on heavy land with a clay subsoil and it has rarely failed to crop heavily. The varieties 'Mother' (dessert) and 'Queen' (culinary) are excellent free-cropping and neat-growing sorts suitable for small gardens but are not mentioned in this section, whereas 'Laxton's Superb,' with its biennial bearing habit is suggested. However, it is necessary to consider exigencies of space in making selective lists.

It is a pity that it has not been found possible to include in the descriptions some short references to the foliage and shape of leaf of varieties. In the identification groups it would, we suggest, be an advantage to indicate the size of the fruit and thus avoid the necessity of turning up a suspected variety in the descriptive list.

"The principal change in the third edition has been the inclusion of coloured photographs of thirty-six selected kinds." This is indeed a noteworthy and welcome addition. Of added value is the representation in colour of the foliage and a half section of the fruit of each variety portrayed. There may be some criticism that a few of the photographs are not representative of the varieties concerned; for instance, that of 'Bramley's Seedling,' is rather highly coloured and that of 'American Mother' seems a trifle out of character. But one has only to remember the wide variations of colouring and even of shape to be seen in the same variety grown under different conditions of soil and culture generally. These differences are always to be seen at the R.H S. Fruit Show and at any other exhibition where the fruits displayed come from widely separated areas of the country. We trust that as time goes on it will be found possible to publish—possibly in a separate volume—coloured photographs of most of the varieties described in the text.

There are one or two slight discrepancies in the text which will no doubt come to light when the next edition is published.

"The Apples of England" is a valuable book of reference to which all keen Apple growers should have ready access. It is full of interest and incidentally makes an excellent bedside book. H. H. C.

"Harnessing the Hormone." By T. Swarbrick, M.A., Ph.D. (Grower Publication, Ltd) 52 pp. 3*s* 6*d*

This little booklet is a reprint of recent articles published in *The Grower*—a periodical of especial interest to market gardeners. As the title indicates, the author has written a popular account of the practical uses to which growth regulating substances can be put. He begins with a slight historical sketch; and in subsequent chapters he briefly considers the recent tests, made as yet with a limited number of varieties, of the use of such substances in controlling the preharvest drop of apples; he mentions the rooting of cuttings of a few plants, he describes the parthenocarpic production of seedless fruits of which the Tomato affords a commercial example. Other possible future uses of growth regulating substances are set out.

The text is written in a popular style, the few illustrations are very helpful, and the information regarding the chemical substances and their rates of application is strictly accurate. In such a slender booklet there is, of course, little or no space for consideration of the underlying scientific data, upon which the general recommendations are based. M. A. H. T.

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JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

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THE SECRETARY'S PAGE

Programme of Meetings.—The following Meetings and Shows will take place during the months of March and April :—

Tuesday, March 4—12 noon to 6 P.M.
Wednesday, March 5—10 A.M. to 5 P.M.
Tuesday, March 18—12 noon to 6 P.M.
Wednesday, March 19—10 A.M. to 5 P.M.
Tuesday, April 1—12 noon to 6 P.M.
Wednesday, April 2—10 A.M. to 5 P.M.
Tuesday, April 15—12.30 P.M. to 6 P.M.
Wednesday, April 16—10 A.M. to 5 P.M.
Tuesday, April 29—12 noon to 6 P.M.
Wednesday, April 30—10 A.M. to 5 P.M.

Daffodil Competition and Show.—At the Show on April 1 and 2, there will be a Daffodil Competition intended primarily for, but not restricted to, West Country growers. The Annual Daffodil Show will be held in conjunction with the Fortnightly Show on April 15 and 16. Schedules may be obtained on application to the Secretary.

Show and Demonstration of Mechanical Appliances.—In conjunction with the Show on April 1 and 2 there will be an exhibition in the Old Hall in Vincent Square of mechanical appliances suitable for horticultural purposes. A fortnight later, on Wednesday and Thursday, April 16 and 17, many of these mechanical appliances will be demonstrated at the Society's Gardens at Wisley. It is hoped that this exhibition and demonstration will give Fellows and others an opportunity to see the latest developments in labour-saving devices for private gardens and other horticultural establishments.

Early Market Produce Show.—This Show, which was last held in 1939, is being revived this year, when it will be held in conjunction with the Fortnightly Show on April 29 and 30. A schedule of competitive classes, open to market growers, may be obtained on application to the Secretary. Individual growers, and growers' associations, including branches of the National Farmers' Union, are also invited to stage non-competitive displays.

Rhododendron Competition.—The Annual Rhododendron Competition will also be held in conjunction with the last Fortnightly Show in April. The schedule, containing numerous classes open to amateurs, may be obtained from the Secretary.

Sewell Medal Competitions for Alpines.—Medals for exhibits of Alpines are offered for award at the first and last Fortnightly Shows in April. Particulars are given in schedules which may be obtained from the Secretary.

Auricula and Primula Competition.—In conjunction with our Society's Fortnightly Show on April 29 and 30 the National Auricula and Primula Society will hold a competition. For full particulars application should be made to Mr. E. J. Dore, The Cottage, Riseley, Reading, the Hon. Secretary of the National Auricula and Primula Society.

Kindred Societies' Shows.—Fellows' and Associates' tickets will admit to the Alpine Garden Society's Show, which is to be held in the Old Hall on Tuesday and Wednesday, April 22 and 23. On the same dates there will be a Show in the New Hall organized by the British Carnation Society, to which Fellows' and Associates' tickets will also admit.

Lectures in March.—On Tuesday, March 4, at 3 P.M., Lt.-Col. F. S. SMYTHE will deliver a lecture on the "Flora of the Canadian Rockies" and on Tuesday, March 18, Mrs. J. NORMAN HENRY, of Philadelphia, U.S.A., will talk on "Uncommon American Shrubs and Plants." Both these lectures will be given at 3 P.M. in the Lecture Room, New Hall, and will be illustrated by coloured slides.

Demonstrations at Wisley.—The following demonstrations will be given at Wisley, each one taking place between 2 P.M. and 4 P.M., that on the second day being merely a repetition of the demonstration given on the first :—

Vegetable Garden.

Wednesday and Thursday, March 5 and 6.—Outdoor Seed-bed and Seed Sowing.

Flower Garden.

Wednesday and Thursday, March 12 and 13.—Rose Pruning and Pruning of Shrubs.

Wednesday and Thursday, March 19 and 20.—Seed Sowing and Vegetative Propagation of Alpines.

Fruit Garden.

Wednesday and Thursday, March 26 and 27.—Spring Spraying of Fruit Trees.

Distribution of Surplus Seeds.—The Society is very grateful to numerous Fellows who have generously responded to the appeal for surplus seeds, published in our issue for October, 1946. The response has been very good, and all seeds which have been received will be distributed amongst other Fellows. Unfortunately, owing to the necessity of printing the seed list at an early date, in time for distribution in the November JOURNAL, it was not possible to insert the names of all the seeds received from Fellows, many of which arrived after the proof had gone to Press.

WISLEY IN MARCH

WITH the approach of warmer weather and, we hope, the end of hard and continuous frost, many of the flowering trees and shrubs in the Gardens will be starting into growth. Beauty and interest will be found not only in the flowers displayed, but also in the unfolding of the growth buds and the casting of bark and bud scales. Once again we can collect the just-opening buds of our common trees for decoration in the house, and some of the flowering shrubs, particularly Forsythias and Spiraeas, open their blooms unblemished by weather if cut in bud and placed in water indoors at this season.

The hard weather of December, January and February will have left its mark on the gardens. Already in January *Acacia dealbata* in spite of a covering of pine boughs had lost practically all its buds, and here and there in the Gardens could be seen a very brown-foliaged Photinia or a Ceanothus of the evergreen type which had suffered from the effects of snow and frost. The wet and mild Autumn probably made plants more susceptible to this spell of inclement weather.

Weather permitting, many more flowers will be seen this month, and for those who can make only a brief visit, the Alpine House and Rock Garden, together with the Wild Garden and Seven Acres, and the main glasshouses will contain the major portion of the display.

On entering the Gardens a walk to inspect the completed planting of Rhododendron species on Battleston Hill will give a first glimpse of the early-flowering species, particularly the pink or pale rose species of the Fortunei section, *R. Fargesii*, *R. sutchuenense* and *R. calophytum*; unluckily all are very subject to frost damage, but it is hoped the planting in thin woodland on an elevated site will help to protect the blossoms. *R. arboreum* in white and pink and *R. Thomsonii* were well set with flower bud in January, and it is hoped that they will have survived the later onslaught of cold. *R. lutescens*, with primrose-yellow flowers, will be found both here and in the Wild Garden, with some of the species already mentioned.

The Alpine House will present the greatest concentration of blossom to be found in the gardens. Most in evidence will be the grand collections of early flowering Saxifragas, the encrusted Kabschias, including many shades of white, pink, and yellow; some of the most prominent are the older hybrids, *S. Irvingii* and *S. Jenkinsii*, together with the more modern additions, *S.* 'Cranborne,' *S.* 'Perle Rose,' *S.* 'Riverslea,' *S.* 'Cherry Trees' and *S.* 'Primrose Bee' in varying shades of pink and yellow. These require only the shelter of a frame during the winter and large pans make delightful house decorations, if taken indoors when in full flower.

Many of the small Primulas add to the display, for example *Primula Allionii* with numerous pink blooms and the variety *alba* with white flowers. *P. Palinuri* has large yellow heads and auricula-like leaves, and *P. marginata* is a very beautiful plant with mauve flowers and heavily farina-encrusted leaves.

Small bulbous subjects are ideal for pot culture and a large number will be found in flower this month. Narcissi are represented by *N. minor*, *N. asturiensis*, *N. Watieri*, and *N. calcicola* with two to four flowered clusters of buttercup-yellow flowers, 6 inches in height. Other bulbs flowering here are *Puschkinia scilloides alba*, an unusual and pretty plant, the variety being much better than the type, and *Sisyrinchium grandiflorum* with grassy leaves and large purple bells.

The Rock Garden also has bulbous subjects in flower. Many Scillas in blue, white, and pink, with the Chionodoxas *C. sardensis* and *C. Luciliae*, will be found here and in many parts of the garden; also the bi-generic hybrid *Chionoscilla Allenii*, a more robust plant than either of its parents. Blue will also be provided by *Pulmonaria angustifolia* and its varieties, a most valuable early flowering hardy perennial of dwarf stature. Two English native plants and their varieties are among our most valued alpines at this time of the year, *Anemone Pulsatilla* a small but striking plant, both in flower and in bud, by reason of its thick covering of silver hairs, and *Saxifraga oppositifolia* growing in the scree with its purple blossoms, which appear large for so small a plant.

In the Wild Garden the most treasured sight is the colonies of self-sown *Narcissus cyclamineus* which will be in full flower by the middle of the month. This plant seems to be ideally suited by the conditions in the damp woodland and the drifts spread slowly year by year. Here also will be found numerous Crocuses and Scillas, and many interesting shrubs. The large specimens of *Pieris japonica* with hanging racemes of white bells, and the upright inflorescences of *P. floribunda*, the latter generally the least damaged by frost, are soon followed by the newer *Pieris taiwanensis*.

The Heath Garden continues its display with the many varieties of *Erica carnea* joined by *E. darleyensis* and the taller growing *E. mediterranea*, all showing against the perfect background of green provided by the larger tree heaths, particularly *E. arborea alpina*, and enhanced by the russet shades of the summer flowering Cornish and Dorset heathers.

Nearer the Pinetum may be seen *Forsythia Giraldiana*, noted last month, and *F. ovata*, a drawfer, neat growing plant, very suitable for the small garden, freely hung with yellow flowers. The last flowers of *Hamamelis mollis* and *H. japonica* may still be showing yellow, a display which has lasted since January.

Near the pond a collection of *Chaenomeles lagenaria* and *C. japonica* with red, pink and white flowers will be in full bloom. These shrubs are better known as *Cydonia japonica* and *Maulei*, and to many people simply as " Japonica." They are often used as wall plants, a position in which they flower freely. Planted in the border they form large, freely suckering shrubs from 3 to 5 feet in height, which give a succession of flowers over several months. Towards the end of the month two fragrant-flowered shrubs will also be in bloom in Seven Acres, *Osmanthus Delavayi* with dark evergreen leaves and numerous small white flowers, and *Nuttallia cerasiformis*, one of the earliest shrubs to come into leaf, with almond-scented, rather inconspicuous hanging racemes of white flowers.

In the Award of Garden Merit Collection many additional subjects have been planted during the past season, and while these can hardly be expected to blossom freely during their first year, the old-established specimens will provide a good display, particularly *Daphne Mezereum* and the very old specimen of *Prunus cerasifera* var. *Pissardii.*

The Greenhouses, particularly the Temperate house, have many flowers to show; several of the previously noted subjects are still in flower, and a number never seem to be without flowers except when they are pruned back, having over-filled their allotted space. Of these, all useful plants for permanent features of a cool greenhouse, *Tibouchina semidecandra* with large purple Melastomaceous flowers, *Chorizema ilicifolium*, *Correa speciosa* var. *Harrisi* and *Libonia floribunda* have been in flower all the winter. New subjects will be the Rhododendrons planted in the centre bed, particularly the large specimen of *R. ciliicalyx* with rose-pink buds and blush flowers, and *R. bullatum*, white and wax-like.

The Half-Hardy House will have a few fresh flowers to show, notably *Lithospermum rosmarinifolium*, another plant which seems to be in flower the whole winter through, *Paeonia Cambessedesii*, an early flowering species which, though hardy, appreciates a little protection, bearing large rose-coloured flowers, against a background of silvery leaves, *P. Clusii*, with white globular flowers, which open as the previous species fades, and *Cyrtanthus lutescens*, a bulbous plant with pale yellow tubular flowers produced over a long period.

A STUDY OF THE GENUS PAEONIA

FOR over twenty years Col. F. C. STERN has been engaged in assembling together a collection of Paeonies and in making an intensive study of the species with a view to publishing a systematic monograph of the genus. It has been known to his friends that no time or trouble would be spared to make the treatise as accurate as possible and to render it worthy of " the King of Flowers " and " the King's Ministers " as the Moutan and herbaceous Paeonies respectively are known to the Chinese.

The Monograph has at length appeared as a handsome quarto volume entitled *A Study of the Genus Paeonia.* It is published by the

Royal Horticultural Society, and in spite of present restrictions is excellently produced and in a generous style. It is copiously illustrated with useful drawings and the inclusion of fifteen coloured plates reproduced from Miss LILIAN SNELLING'S exquisite watercolour paintings gives great artistic charm to the volume. The monograph is confined to species and varieties, garden hybrids as a whole being omitted. The botanical descriptions are based exclusively on wild specimens though many notes on modifications and other points which are observable under cultivation are included.

The preparation of a systematic revision is essentially work for the trained systematist, since, as well as pure botany, a wide knowledge of botanical literature is necessary, especially in a genus known and cultivated in gardens for many centuries. But Col. STERN, undaunted by the magnitude of the task, embraced with his wonted enthusiasm this aspect of the research. After prolonged study he became master of his subject in the three great fields of investigation—namely, in the garden, the literature and the herbarium. By means of the unique collection at Highdown, which included much authentic material often secured at considerable trouble from the " type " localities, he gained unrivalled experience, and became intimately acquainted with the species, and with their variation under different conditions as well as with problems arising from their genetic constitution. This knowledge, most valuable in itself, was also of great service in the two other fields. It is specimens described by botanists in the past, writing in diverse tongues, and now to a very large extent preserved in the great herbaria of the world, that form the basis of plant-classification and nomenclature. For the purpose of a taxonomic monograph these descriptions have to be carefully studied and compared, and the actual specimens, if extant, examined and correctly interpreted. It is here that an intimate knowledge of the species in the living state is often of such great help. In the case of the genus Paeonia historical specimens in the herbaria of Paris, Vienna, Leningrad, Calcutta and elsewhere had to be investigated, as well as a great wealth of less important material. In addition there is the more general botanical literature, especially floras, requiring attention. Records in floras have to be verified as far as possible or faulty conceptions of geographical distribution may be obtained. Col. STERN found, as does every botanist engaged in such research, that the aim should be a study of all specimens and the entire literature. If the study be perfunctory the work is liable to subsequent correction, often with unfortunate results such as change of name. The references cited, the notes in the text, together with the remarkable historical chapter at the end show how thoroughly the attempt at completeness has been made. In all this research the author has wisely been in consultation with professional botanists at home and abroad.

The volume is divided into five chapters. Chapter I concerns classification, and contains notes on morphology and cytology. An entirely new set of keys is provided for the subsections, species and varieties, this being an important and extremely useful practical contribution to the study of a genus. The scope of this chapter might usefully have been enlarged. Chapter 2, which provides an annotated summary of the species according to the sections and deals also with geographical distribution, makes interesting reading even for the non-expert. It is illustrated with maps and charts and ends with a stimulating discussion on the distribution of the genus in the light of the cytology. The main portion of the volume, and that which will be most generally used, namely, the systematic enumeration, with descriptions, synonymy, distribution and references to literature, is found in Chapter 3. The descriptions are concise, and not highly technical. The species are not always easy to separate, but the keys will facilitate the work of identification, though the use of these requires close attention and experience. Chapter 5 is headed Paeonies in Cultivation, whilst Chapter 4 provides an epitome of the history of the Paeony from the time of Theophrastus onwards, and is noteworthy for including reproductions of three illustrations from the sixteenth century herbals. The later history is chiefly the concern of the botanist and the Paeony expert, but the earlier history as told in the herbals and other old works has a more general interest and fascination of its own.

The present researches, and the revisions based upon them, have necessitated several changes of name. In general, a broad view is taken, several plants described as species being reduced to the rank of varieties. This is frequently the consequence of taxonomic revision, but the author's gardening experience permits him to speak with more than usual confidence.

Col. STERN is to be warmly congratulated on the completion of his investigations. " A Study of the Genus Paeonia," the product of that ideal combination of gardener and botanist, is no hasty revision. It records the conclusions of an expert after years of patient observation and research and thus attains an exceptionally high standard. It may be expected to earn world-wide approval and to stand the test of time. The Royal Horticultural Society also is to be complimented on undertaking the publication of such an important scientific memoir and producing it in a form which is a delight to the eye as well as to the mind. A. D. COTTON.

"A Study of the Genus Paeonia," by F. C. Stern, O.B E., M.C., F.L.S., V.M.H. Imperial quarto, pp. 155. Illus. 15 pp. in colour by Lilian Snelling and text figures by Lilian Snelling and Stella Ross-Craig. R.H.S. 3 guineas.

ORCHIDS FOR AMATEURS

By E. Cooper

A SHORT paper such as this cannot embody full details of cultivation ; the general outlines are touched upon, but success attains more through studying individual plants rather than from endeavour to follow rules. There are few plants more easily grown and more adaptable to greenhouse treatment, but essentials must have consideration.

The order is very large and widely distributed. Many species are among the most beautiful in the floras. Horticulturally, two sections only are of interest, the terrestrial and epiphytic. Ages ago all were doubtless terrestrial, but in the struggle for existence, light, air, etc., many altered to epiphytes, growing on trees and rocks but directly deriving no nourishment from their supports. It is from this section that most of our cultivated kinds are grown, with the exception of the greenhouse (so-called) Cypripediums. These epiphytals have evolved deviations in growth, habit, etc., though their analogies are present in the terrestrials, but their cultivation, with a few exceptions, presents less difficulty.

Though chiefly from tropical countries, it does not follow that all kinds require great heat throughout the year. Many grow at elevations and are adapted to lower temperature in winter than in summer. A first essential is to know, approximately, these lower temperatures. Most of them enjoy a warm, moist, tropical or sub-tropical atmosphere when growing, and a cooler, dryer atmosphere when growth is finished for the season. Kinds from near the equator, especially if near sea-level, do want considerable warmth throughout the year, and a few come from localities in which a cool, moist, equable atmosphere maintains.

To grow a comprehensive collection at least four houses would be needed to give the requisite winter temperatures at night: (1) A warm house, in which the minimum should be 70° Fahr. (2) An intermediate house, with a minimum of 60°. (3) The cool house should have a winter night warmth of 50° or slightly higher. A varied selection can be grown in it and it is usually more suitable to the amateur. (4) This fourth house should be devoted to *Odontoglossum crispum*, its near allies, and the many beautiful hybrids derived from it and Odontiodas, hybrids between Odontoglossum and Cochlioda. An extensive range of hybrids is available. In many localities this house needs attention several times in the day to induce a moist, cool consistent atmosphere as near 60° as possible in the summer, arrived at by manipulation of shading, ventilation, damping and spraying. On many summer days heat will be in excess, but night air may be admitted and whenever weather permits from spring to autumn. In winter, night temperature may fall to 50°, but should rise to 55° in the day. Cold, dryness and excessive pipe heat are resented. Masdevallias and other species may be included, especially *Oncidium macranthum, loxense, serratum, superbiens*, etc.

Epiphytic Orchids may be broadly divided into three groups, and their characteristics and gradations should be studied. A number, e.g. Masdevallias, have clustered leaves springing from a rhizome. In many genera, pseudo (false) bulbs are present, varying in shape and size—just a thickening of the leaf base; club-shaped, ovoid, conical, small or large, with one or more apical leaves and often basal sheathing leaves, stem-like, often leafy; their length, or partially so, thin or stout, varying in height from inches to several feet. In Vanillas, some Angraecums, etc., long ascendant stems have been adapted, and in the Vanda family erect growths or stems are formed, continuing to elongate and leaf for many seasons. Leafless species are known. The leaves also show various shapes and characters: they may be large or small, plicate, smooth, ribbed, stalked or sessile, thin, fleshy or leathery, in some terete, etc., in some deciduous, all adapted to the natural needs of the plants and under cultivation guides to treatment.

The mature pseudobulbs act as food stores, if of a soft texture for a short time; if hard, and particularly if accompanied by coriaceous or deciduous leaves, for longer periods, in some cases months. They may be clustered or at intervals on the rhizome but support the young growth when it first appears and often the earliest roots; the deduction is that such plants must not be watered regularly in winter. In their homes rain might or might not occur at varying intervals, but probably in early morning moisture would be in the air and keep them plump. Pipe heat is unnatural and water should be given if the leaves approach flaccidity or the bulbs shrivel slightly. When the leaves are very thick and hard, though the bulbs may be very small, as in *Oncidium splendidum*, water can be withheld for several weeks. Calanthes, with their deciduous foliage and stout bulbs, are examples of this resting period; no water is given from the leaf falling till growth is seen. With leaf-retaining Orchids, if correct temperatures are kept, moisture can be present in the atmosphere and many can then keep vigorous without watering. Kinds with soft texture in leaf and bulbs should be frequently looked at in winter and water given before the compost gets really dry. Terete leaves are indicative of resistance to too much rain or strong sun, perhaps both.

The plicate leaves of Calanthes, enfolded when young, give warning, when too late, of the misuse of the syringe, as moisture lodging in them causes rot. Until fully expanded never syringe plicate leaves. To Lycastes and Pleiones the rule specially applies.

General cultivation. Houses: very few houses are entirely unsuitable to Orchids, their vitality is such that some, if not many, can be grown. Avoid a " lean-to " with a north aspect unless it can easily be converted into a " hip-span." Span-roof houses are preferable and brick sides are more suitable than those of wood. Ventilation should be arranged for by lights, approximately 15 inches deep, hinged to the ridge on alternate sides. Side lights can very seldom be used. Not absolutely necessary, but useful, are wooden ventilators placed in the sides below the stages and opening on to the hot-water pipes. If the floor is solid it should be removed or covered 2 inches deep with granite chips, shingle or similar material. The best floor is the natural earth, the paths may be solid or of duckboards, the latter being better.

Airing. Fresh air is necessary and should be admitted whenever weather permits. Draughts must be avoided, often air can only be given on the leeward side. Open the vents by degrees, never so widely or so suddenly as to cause loss of temperature or humidity. The bottom vents are useful in windy or moderately cold weather.

In winter, mild or sunny spells, however short, should be used. In the warmer houses the greater warmth needed must be considered. Night air is beneficial, and from spring to autumn can be given in varying degrees, chiefly to the cooler houses, seldom to the warm house. Weather rules the admittance of air.

Atmosphere. All Orchids enjoy a moist atmosphere especially, when growing during warm days. In nature the greatest warmth is at midday and afternoon, the coolest period towards sunrise, then night temperatures under glass may be at their lowest. The cool, intermediate and warm houses may have a decided increase in warmth in summer by sun heat—not available every day, so take advantage from April to autumn. In summer the warm house may rise to 80–90°, the intermediate to 80°, and the cool to 75–80°, all with shading and extra humidity.

Humidity is obtained chiefly by "damping," that is by hose, syringe or rose-can, damping, not flooding, all available places—floors, walls, stages and particularly odd corners which, if overlooked, give homes to insects. In summer the operation is called for several times a day. In winter, on account of the pipe heat, more frequently in the warm houses than the others ; the cool house but once or twice, possibly not at all. In winter in particular never damp so late in the day as to affect the foliage by night condensation. Hard water may be used.

Syringing. Benefit accrues by the careful use of the syringe in summer, especially in the Odontoglossum and warm houses, but avoid leaving the foliage wet through the night. Spraying is better than heavy syringing. In winter the warm house may have to be syringed on occasion as the pipe heat dries the atmosphere.

Shading is required on all houses at times in February, then throughout the summer. In autumn, shading must be decreased, then discontinued ; light and air are then needed to ripen the plants previous to winter, especially in the three cooler houses. All hard pseudobulbed and deciduous kinds should have full sunlight, at any rate in September. Blinds are an advantage as permanent shading adds to the gloom of dull days ; if the only means, then thin stippling should be applied by the end of February and further coatings as required, or blinds of thin material can be adjusted inside the glass.

Resting has already been touched on. Before giving full rest see that the bulbs are matured. If young growths are present water very carefully through the winter. If the houses are at hand remove such plants from the cool to the intermediate, and intermediate kinds to the warm. Study the plants, the species have adopted regular habits. In the intermediate house hybrids, Cattleyas, Laeliocattleyas, etc., have largely replaced species. Until of full strength hybrids seldom require rest, but once full size has been reached take advantage of quiescence in any plant and give a rest, short or long, until signs of growth are seen.

Watering. Rain water is much preferable to hard water. Whenever a plant is watered, water it thoroughly, even in winter. Water infrequently any pseudo-bulbed Orchid when growth first appears, frequently when roots are active and numerous. In summer err if anything on the liberal side.

Potting, generally effected just as or before growth appears, is a simple operation but cannot well be described as the composts should be inserted in vertical not in horizontal layers. The fibres used should be near to *p*H5 in acidity and mixed with Sphagnum Moss. A practical demonstration will be freely given in any Orchid nursery, and information on the different composts used. After repotting do not water for a few days, shade and spray the plants but not to excess.

Heating. It is an advantage to have a control valve to any existing service, and often if an auxiliary service can be added with a control valve, benefit and economy are found in very cold weather as the extra heat radiating surface will give required temperatures without fiercely hot pipes.

Kinds. Space precludes description, and varieties for the cool house only can be given. *Lycastes*, particularly *L. Skinneri, aromatica, cruenta, macrobulbon, Deppei, macrophylla, gigantea, fulvescens*, and several *Lycaste* hybrids. *Laelia anceps, autumnalis, Gouldiana, albida*; *Epidendrum vitellinum* and its variety *majus, dichromum, nemorale, fragrans*; *Stenoglottis longifolia* (a deciduous terrestrial); *Maxillaria grandiflora venusta, Sanderiana, Huebschii, picta*; *Coelogyne cristata, ochracea, ocellata, Mooreana*; *Odontoglossum grande, Insleayi, Williamsianum, Rossi, Cervantesii, apterum, caudatum, citrosmum, Uroskinneri*; *Oncidium curtum, Marshallianum, crispum, Forbesii, Muntinii, tigrinum, cheirophorum, leucochilum, incurvum.* Anguloas require the warmest corner when they commence growth. *Bifrenaria Harrisoniae, pubigera*; *Brassia verrucosa, brachiata*; *Vanda Amesiana, Kimballiana*; *Cattleya citrina*; *Sophronitis grandiflora*; *Dendrobium nobile* and vars., *infundibulum, chrysotoxum, aureum, falcorostrum speciosum, chrysanthum, crepidatum*; *Jamesianum, Eria coronaria.* Zygopetalums, Pleiones, Promenaeas and many others.

Miltonia vexillaria and its varieties can be grown but really need a winter temperature of 55–60°.

Where choice is confined to one class, suggestion is made that either Cypripediums or Cymbidiums be selected. In the former, apart from *Cypripedium insigne* and its varieties, which all flower better with rather more heat than that afforded by the strictly cool house, the present-day hybrids should be used for selection. Many are superior to the species in floral coloration and variety. All winter-flowering forms may be collected if so desired. They are easily grown, but the winter night temperature should be 55–60°, as that allows a fairly moist atmosphere but excludes most hybrids from tropical species, generally with mottled foliage. They require the warm house to do well.

Cymbidiums can be strongly recommended. Many of the old heavily built conservatories are suitable, and decorative effect is obtained when artificial rockwork can be used and the plants placed in pockets. The present, day hybrids nearly all derivatives from *C. insigne*, have in the greater number tall spikes with long-lasting flowers. A wonderful range is seen in their colours though decided brilliance is yet absent. As with the Cypripedium hybrids, practically all tastes can be pleased, but to ensure suitability it is better to procure plants in flower. The cool house is suitable, but Cymbidiums do not resent a fall to 45° or even lower. They enjoy the syringe in summer and night air whenever outside conditions allow. Compost consists chiefly of fibrous loam in rough lumps with Sphagnum Moss. Scale insects can too often be found between the bulbs and the sheathing base of the leaves. Red spider is partial to the underside of the foliage.

As with the Cypripediums, root action continues through the year; only occasionally can a Cymbidium plant be rested, a growth or flower spike being usually present.

CONTINUOUS CLOCHE GARDENING

By C. P. Quarrell, B.Sc.(Hort).

TWELVE thousand persons visited an Exhibition of Continuous Cloches held at the "Old" Royal Horticultural Society Hall in London during February 1946. This fact in itself is sufficient to illustrate the immense interest shown in this form of gardening in Britain nowadays. According to the estimate of one manufacturer, about five million cloches are in the possession of private and commercial growers at the present time. These miniature glasshouses or small plant protectors have increased in popularity to a remarkable extent during the six war years, and there is no doubt that they have made a real contribution towards increasing the food production and in helping to fill the gap in supplies of early vegetables created by the cessation of imports during those years. Commercial growers quickly realized their suitability for producing early salads and Tomatoes while the amateur welcomed equipment which enabled him to produce out-of-season vegetables by comparatively simple methods. Furthermore, the restricted and very limited supplies of frame lights and glasshouses still further increased the demand for cloches.

What is a Continuous Cloche? Many forms of plant protection have been designed in past years, including the French garden cloche or bell-glass and the Evesham Cap-glass or hand-light, in addition to glasshouses and various types of frame. The French cloche used in French gardening is shaped exactly like a bell made of glass (French "cloche" means bell, hence the name "bell-glass"), so that when placed in position over plants air is completely excluded for all practical purposes. It is a pity that the name "cloche" was used for the modern continuous cloche for they are very different in construction and require a totally different technique in horticultural practice. The original continuous type of cloche was invented by Major L. H. CHASE in Britain in 1912. Most gardeners are familiar with the general construction of continuous cloches whether they be a home-made pattern or one of the manufactured types. Usually shaped like a tent or a barn they are constructed with sheets of glass held together by means of wire, metal strips or wood. The cloches are placed end to end, touching one another so as to form a continuous range or row. The ends of the ranges are closed with sheets of glass or wood held in position with wire or wooden stakes. Being made of ordinary flat sheets of glass and constructed on simple lines the sheets of glass do not fit so closely that air is entirely excluded, hence they are characterized by a degree of permanent ventilation.

In respect of horticultural use it may be said that continuous cloche cultivation is essentially one in which the glass is taken to the crop and not the crop to the glass. The equipment, therefore, must be easily transported. What characteristics should a continuous cloche show? I suggest that a continuous cloche should provide protection to the crops growing beneath it which are nevertheless able to receive the maximum amount of available daylight all around the plants. Furthermore, it should be sufficiently narrow to permit established plants to derive some benefit from natural rainfall or artificial watering falling on and around the cloches while these are still covering the plants. Again, it should be conveniently portable and reasonably rigid so that it can be carried from place to place as a complete unit and not in parts as in the case of a garden frame and its lights. They should be able to withstand reasonably strong winds without damage when properly set in position. Ventilation should be permanent and preferably adjustable. Thus continuous cloches are portable, self-watering to a certain degree, provide the minimum obstruction to daylight and sun-heat, provide some protection from excessive rain, wind and frost, are either permanently ventilated or capable of being ventilated and are normally for use in a continuous row or rows.

It will be realized that these characteristics of continuous cloches result in the provision of a special set of environmental conditions for the crops grown under their protection which are different from those which obtain in frames or glasshouses and of course from those in open air. Light is freely available to the crops under cloches from the time of sowing or planting compared with frames for example in which the woodwork may cause some shading. Permanent ventilation provides an atmosphere which is less humid and probably cooler than that in frames used in the orthodox manner for seedlings and young plants. On the other hand, the temperature and humidity inside a cloche is obviously greater than that in the open air, and of course, the protection from wind is of considerable value for strong wind, whether cold or warm, is surely entirely harmful to growing plants. Thus plants grown during winter and spring under cloches are more tender and more actively growing than those exposed to the open air and yet they are forwarded rather than forced since the permanent ventilation and ample supply of light induce the development of hardier and sturdier growth than might be expected in some types, at least, of frames and glasshouses. (This difference is reduced when soil-warming is introduced to cloche cultivation.)

Generally speaking continuous cloches should be regarded as a means of protecting and forwarding crops which are normally grown in the open. Regarded in this light and without suggesting any comparison with other forms of glass protection such as frames or glasshouses, cloches provide advantages which include the following :—

(1) They preserve soil tilth and condition as well as slightly pre-warming the soil, when placed in position a week or so before sowing or planting and assuming that at the time of covering the soil was "just right," or perhaps a little too moist for sowing. Such protection enables sowing or planting to take place at a planned date, even if heavy rain or excessive frost has rendered the outdoor land unsuitable for such work.

(2) They provide protection from wind which, whether warm or cold, may cause the loss of excessive amounts of moisture from both soil and plant. This retards growth—a form of damage which may not be so generally recognised as that which plant tissues suffer when exposed to extremely cold winds.

(3) They protect the parts of the plants above ground level and the surface soil immediately around the plants from rain. This is beneficial during frosty periods for the foliage and surface soil being dry the plants are more resistant to frost damage.

(4) When closely fitted together they form a protection from birds.

(5) Fungicides and insecticides applied to the cloche plants remain effective for longer periods since they cannot be washed off by rain.

(6) The semi-hardy type of growth induced enables the plants to withstand some frost and the glass itself constitutes a physical protection to some degree.

DISADVANTAGES

(1) Although portable, the movement of cloches from one crop to another or for weeding or other attention to the plants is obviously another task for the gardener. This factor also applies to frames, but they have the advantage that in moving one frame light a greater area of cropped land is exposed for attention than in the case of a cloche. When used commercially the cloches are planned and arranged in narrow strips with vacant land between so that when necessary the cloches are moved sideways on to the succeeding crop a distance of 1 or 2 yards only.

(2) Like frames the cloches are normally insufficiently tall to protect many kinds of plants throughout their life. Hence crops such as Sweet Peas and Chrysanthemums can receive glass protection only for part of their life.

(3) Breakages from careless handling of the cloches and occasionally from gales may occur. If the cloches are correctly placed in position with the ends closed and reasonable care in handling them is exercised, the extent of breakages should not exceed 5 or 6 per cent. (based on reports from commercial growers).

SOIL PREPARATION

Cloche cultivation, like all forms of intensive gardening using glass protection, demands more out of the soil than open air culture. If cloches are used fully they should protect at least three crops per year for a part of their life, and since by the use of glass protection the plants are induced to grow more quickly the soil must be sufficiently fertile to "keep pace" with the accelerated growth and increased annual production. Moisture retention by the soil is obviously of even greater importance for cloche gardening than out of doors, hence the importance of ample supplies of organic humus-making material cannot be overstressed. Where farmyard or similar manure cannot be obtained properly made compost material will serve as well or even better. Generous manuring with organic or inorganic fertilisers is advisable for the crops must receive their full requirements of nitrogen, phosphates and potash. In addition, the lime content must be adequate and drainage satisfactory. Thorough and intelligent cultivations are essential and in short the greatest possible attention should be given to the preparation of the soil in its widest sense. This matter has been stressed, even though it may appear elementary to many gardeners. Far too often beginners imagine that cloches possess some magical properties whereby all that is necessary is to sow the seed or plant in any odd corner and place the cloche in position!

WATERING

An important part of the technique of cloche cultivation is that when preparing the soil not only must ample plant food and humus be provided but steps must be taken to ensure that the prepared soil is sufficiently moist before cropping begins. Thus for spring cropping the site must be able to receive full benefit from winter rains and when preparing the ground in summer it may be necessary to water the subsoil in open trenches as well as the top soil. This is necessary to ensure that the soil is sufficiently moist to supply seed or plants adequately for growth until they have a sufficiently extensive root system to draw on a wider area, and greater volume of soil. It has been said earlier in this article that cloches should be sufficiently narrow to permit the natural rainfall or artificial watering outside the cloches to benefit the cloche crop, and providing the soil is sufficiently moist to give the young crop an adequate start, there is little doubt that most crops will give satisfactory results without the need for watering under the cloches. On the other hand, if the soil at sowing or planting time is dry, rain or artificial watering outside the cloches will not moisten the surface soil under the cloches, and therefore failure is certain. Exceptions to the general rule in respect of water from outside the cloches benefiting established plants do occur, such as during an exceptionally dry period when the soil which was moist at planting time becomes too dry for full plant growth. Watering under the cloches is advisable in this case, especially for plants such as Marrows or Cucumbers. Such watering should be carried out with due consideration of prevailing weather, for should frosts occur, freshly watered plants are more susceptible to damage. When relatively small numbers of cloches are used, it may be advisable to remove the cloches during a warm gentle rain if the soil has become too dry, and plant growth is evidently retarded in consequence.

SUMMER AND WINTER CARE

Although normally the cloches are placed end to end fitting closely together, it is often necessary during hot, sunny weather to space the cloches about 1 inch apart to provide extra ventilation or if the type used has adjustable ventilation to open these to the maximum. Furthermore, for certain crops such as Melons which are subject to sun-scorch light flecking with lime wash may be required to provide shade.

If at any time the cloches are not in use, they may be stood upright on their ends and " nested " in together to occupy less space.

In winter as a general rule no extra covering such as sacking or hessian is provided over the cloches, though this may be advisable in very cold districts (say Scotland). During severe frosts the cloches should not be moved, for if frozen to the ground, attempts to move them will result in breakages.

There is a wide range of crops in the cultivation of which cloches can play a useful part. Seedlings may be raised for planting under other cloches or out of doors. Tomatoes, Lettuces and other salads may be produced earlier than out of doors, and often the produce is of better quality. Even crops such as Melons and Sweet Peppers are successful in the warmer districts. Strawberries and Raspberries are produced out of season. Flowers such as early Narcissi, Polyanthus and Annuals are very successful, while Sweet Peas, Gladioli and even Chrysanthemums are forwarded.

In some cases the crop receives glass protection throughout its life, while in others the cloches remain in position only until it is safe to remove them and allow the plants to grow on in the open. Sometimes even the taller growing crops can be protected throughout their life by using specially large cloches; by raising normal cloches by some means of support and providing extra side-glasses; or by planting the crop in a narrow trench which is bridged or spanned by the row of cloches.

It will be realized that in order to make the fullest possible use of the glass protection it is necessary to plan the cropping and time the sowing, planting, cloching and de-cloching dates carefully. Thus as a general principle, whenever a row of cloches is placed over a first crop it is advisable to reserve an equivalent area of land in readiness to accommodate the next cloche crop at a later date when the cloches become available from the first crop. Certain sequences of rotations of cloche crops have proved satisfactory after several seasons' trials, and some indication of such successional cropping will be given now.

Thus, autumn or January sowings of Lettuces, Peas, Broad Beans, Radishes, Carrots or annual flowers, should receive protection until late March or April. Then the cloches may be moved on to protect such crops as Tomatoes and Marrows (these early crops being from plants raised in heated glasshouse), French and Runner Beans and Sweet Corn. These crops are decloched some time in June and the cloches used to protect Melons or Cucumbers, Aubergines (Egg Plants), Capsicums or later batch of Tomatoes. In September they are sometimes used to hasten the ripening of Tomato fruits or Onions, and in October to forward August open-air sown Lettuce and Endive to cut in November or to raise Lettuce seedlings for spring planting in the open or for cloche planting in December or January. Sowings of Broad Beans may also be made under cloches in late autumn. In the north and cold districts Spring Cabbage can be produced very successfully under cloches, though climatic conditions make it difficult to grow the crop in the open. In such colder districts too the glass protection makes it possible to forward such crops as Tomatoes and Sweet Corn so that they are sufficiently forward to finish growth and produce ripe fruits in the open in spite of the climate.

The raising of Cabbage, Cauliflower, Lettuce and other vegetable plants for planting in the open garden is another use for cloches. Amongst flower crops Sweet Peas sown in late September or January directly under cloches and protected until the end of April or early May will produce flowers at the end of May or in June, depending on the district. Lettuces can be grown successfully as an intercrop with the Sweet Peas. Annual flowers such as Nigella, Larkspur, Cornflower, Viscaria and Calendula are excellent subjects for autumn sowing under these protectors.

Strawberries cloched in February or March reap the benefit of earliness and protection from birds and the cloches can afterwards be conveniently moved on to Melons. In winter the same set of cloches can be used to forward Violets. If not needed for Violets or other crop the cloches may be used to protect recently planted Strawberries from late October with advantage.

Planning the Cloche Garden

As previously indicated, when planning the cropping sequence the cloche gardener must not only give full attention to correct timing of sowing and planting dates, but also must so plan his cropping that he has vacant land available to accommodate the successional crops as and when required. Thus if a crop of Lettuces is cloched in winter and Spring there must be an equivalent area of land available in April ready for planting and cloching a second crop. The land occupied by the Lettuces can be cleared and prepared in time to accommodate a third cloche crop when the cloches can be moved from the second crop. Inevitably this means that labour is required to transport the cloches from one crop to another, and if the sites for the respective crops are at widely separated distances, the work becomes long and tiresome. Thus a certain amount of foresight and planning is advisable, and whenever reasonably large numbers of cloches are to be handled one or other of the so-called strip-cropping systems of planning should be adopted. The basis of strip-cropping depends on the movement of one, two or even four rows of cloches in a sideways direction on to an adjacent strip of land of equivalent area which has either been left vacant for the purpose or has just been cleared of a preceding crop. The rows of cloches should run north to south.* Three systems will be described briefly :—

(a) *Simple alternate strips.*—In this method the first step is to divide the plot into strips of land of sufficient width to accommodate two rows of cloches separated by about 4 inches and a pathway of about 18 inches on one side of the pair. (If each cloche is approximately 2 feet wide these strips should be 6 feet wide.) The first strip will carry a crop covered with a double row of cloches, while the adjacent strip is fallow. The third strip accommodates another double row of cloches protecting a similar crop, the fourth strip is fallow and so on across the whole plot. When the first crop can safely be decloched and allowed to continue its life in the open air, the cloches are moved on to the adjacent " fallow " strips which by now have been planted or sown with the second cloche crop, which might be Tomatoes. Here the cloches remain until the date arrives when it is considered safe to decloche the plants. Meanwhile if the first crop was Lettuce, Carrots or Radish it will be harvested and the land prepared and manured in readiness for the third cloche crop of the season. Thus at the appropriate time the cloches are removed from their positions covering the second crop which we said might be Tomatoes, and transferred to their original strips now planted with a third crop such as Cucumbers. This enables one set of cloches to be used for the protection during part at least of their life of three crops in one season, at the same time avoiding the necessity of conveying the cloches from one end of the garden or plot to another.

(b) *Alternate strips with " stacking " and spray-pathways.*—This method was designed for use on commercial holdings to meet two problems which might arise when very large numbers of cloches are used. The first problem was that of providing storage space convenient to the site should it be necessary to remove the cloches altogether from the third and last crop of the season in normal commercial usage. The second problem was that of applying insecticides or fungicides to large numbers of plants involving the use of moderately large spraying machines. These difficulties have been met in this second cropping plan by providing special pathways at appropriate intervals for stacking the cloches and for conveying a spraying machine between the rows. Otherwise the double rows of cloches (if strip 2 feet wide) with 18 inch pathways are accommodated on 6 feet strips as before. The rotation of cropping and cloching is so arranged that when the cloches have to be removed from the third crop there are two rows of cloches on either side of a stack pathway, and a single stack path will accommodate four rows of cloches when these are stacked on their ends and "nested" in together. The width and position of the spraying pathway depends on the size of the machine on the one hand, and on the position of the crops which will require spraying on the other hand. At the end of the season when the crops are all harvested, it will be found that the rows of stacked cloches are sufficiently widely spaced to enable the land to be ploughed conveniently with a small tractor, leaving the cloches stacked until required for the first crop of the next season.

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* The direction of the cloche rows is not considered vitally important. In exposed places it is sometimes advisable to place the rows at right angles to the prevailing gales—so that the inner rows receive protection. For early spring crops it may be better to place them east to west.

(c) *Short period protection or extended system.*—On the principle that many crops benefit from glass protection even though this protection is provided for only the initial stages of the growth of the plant, this third system has been devised. A single or double row of cloches is moved from crop to crop, protecting each one for a few weeks only and moving always on to "new" strips in the same sideways direction. Thus five successive sowings of a crop such as Radish or Lettuce or a series of different crops, are made in correctly measured strips from left to right and the cloches moved in the same direction after protecting each for a short period.

Other systems of cropping will no doubt occur to the practical gardener, but in the writer's opinion the first method is probably best for small units of cloches since this involves the minimum waste of land. The second system is particularly recommended for commercial establishments, having proved quite satisfactory on a large scale, though some growers may care to try the extended system. It should be realized that it is only possible to grow the third crop on the site of the first crop if the latter has been harvested and cleared sufficiently early in the year to allow soil preparation and the sowing or planting of the third crop at the correct time. Thus if Sweet Peas are the first crop they will occupy the land throughout most of the summer, and so a third strip of land must be provided to accommodate a third cloche crop.

The system of using the cloches during as many months of the year as possible may be further clarified by arranging the various cloche crops into groups according to the season of the year. Exact dates of sowing and decloching and also the precise selection of crops will depend partly on the climate of the district. The following tabulated list indicates only some of the crops which are suitable. Dates (where mentioned) apply principally to the southern half of Britain and may need modification for very cold or very mild districts.

Season.	*Period Cloched.*	*Crops.*	*Earliest Picking.*
Early Spring	December-January to Early April	Lettuces *	April
		Radishes	March
		Carrots	May
		Peas	May

* From seedlings raised under other cloches in October.

Season.	*Period Cloched.*	*Crops.*	*Earliest Picking.*
Early Spring	Early March to April	Turnips	May
		Beetroot	June
Late spring .	Early April to late May	French Beans	June
		Runner Beans	July
		Tomatoes	July
		Marrows	mid June
		Sweet Corn	July
Summer	June to September	Frame and Ridge Cucumbers	July
		Late Tomatoes	August
		Melons	August
		Aubergines	September
		Sweet Peppers	August
Autumn .	Early October to December	Lettuce	November
		Endive	October
	Also September-October to April	Sweet Peas and other hardy annuals	end May and June
Other periods.			
	Sept. to late Feb.-March	Violets	November
	Late Feb.-March to June or Oct. to June	Strawberries	late May
	End April to June-July from plants raised in heat or directly sown under cloches	Zinnias and other half hardies	Early summer
	Dec. to March	Polyanthus	February

Zinnias have proved successful in the south from sowings made directly under cloches in late March.

Flowering bulbs respond well to cloche protection, but care must be taken not to give protection too early, for unless the cloches can be raised or are constructed especially tall there is a danger that the crop may reach the glass before the danger of frost has passed.

Perpetual flowering Carnations can be flowered in August when grown for one season under tall cloches from glasshouse-raised plants planted in 9 inch deep trench in late March or April.

Cloches may be used also for ripening harvest Onions in September when wet weather may make the process uncertain when carried out in the open. Tomato fruits may be ripened off at the end of the season by placing on a lawn or on dry peat or straw and covering with cloches (Fig. 49). Better quality fruit is obtained if the fruits are ripened on the plants, and this can be done by untying the plants from their stakes, laying them on straw or peat covered soil adjacent, and covering with cloches.

NOTES ON SOME OF THE PRINCIPAL CLOCHE CROPS

SPRING LETTUCE

Seed is sown under cloches in October or at the end of September in cold northern districts. The seedlings are transplanted into their permanent quarters under other cloches between late November and late January. The seedlings are spaced about 8 or 9 inches apart each way, the outer rows being 4 to 6 inches distant from the glass walls of the cloche. The favourite variety in nearly all districts is ' May King ' (syn. ' May Queen ') though ' Winter Victor ' and the ' Improved Trocadero ' type are successful in some gardens. The cloches need not remain over the Lettuce until they are cut, though the colour and quality may depreciate if severe weather follows decloching. They should mature in April.

RADISHES

Early sowings may be drilled in rows 3 inches apart on well prepared soil, in batches from December to March under cloches. Thin sowing or early thinning so that each seedling stands ¾ inch away from its neighbour is essential. Suitable varieties include ' Short Top Forcing,' ' Sparkler ' and ' French Breakfast.'

PEAS

Seed should be sown directly under cloches in November or January in the usual way. The varieties ' Meteor ' and ' Laxton's Superb ' are recommended (Fig. 46).

CAULIFLOWERS

Seed is sown in late August or early September and the seedlings transplanted under cloches in October spaced about 3 inches apart each way. There they remain until late March or early April when they may be planted in the open Alternatively the plants may be planted under other cloches 18 inches apart in February to be protected until nearly mature. January sown Cauliflowers will produce early plants for open air culture.

CARROTS

Early bunching roots are best obtained from sowings made under cloches in December or January. Seedlings must be thinned out to stand about an inch apart, as thickly growing Carrot seedlings will not mature early. Varieties recommended include ' Amsterdam Forcing ' and ' Early Nantes.'

TURNIPS.

Seed should be sown from the middle to the end of March and the seedlings thinned out eventually to stand 4 to 6 inches apart. If sown before early March the crop is certain to bolt to seed. A good variety is ' Early White Milan.'

BEETROOT

Sow in late March or early April, thinning out the seedlings as for Turnips. Earlier sowings are prone to bolting. Varieties recommended include 'Detroit Red Globe' and 'Cobham Early.'

FRENCH BEANS

Sow at the end of March to mid-April, 4½ inches apart, later thinning the seedlings to stand 9 inches apart in the rows. Sow again in July for late autumn cloching and picking. Variety, 'The Prince' and others.

RUNNER BEANS

Sow during April spaced as suggested for French Beans. Good varieties include 'Princeps,' 'Prizewinner,' 'Streamline' and 'Kelvedon Wonder.'

TOMATOES

The earliest crops are obtained from plants raised in a heated glasshouse, but grown sturdily and finished in a cool house before planting under cloches during the second week of April in the south and early May in cold districts. If planted out too early the plants may grow too tall and require decloching before the danger of late spring frosts is past. After decloching the plants are staked and grown as an open-air crop. If especially large and tall cloches are used and the plants planted in a 6-inch deep trench it is possible to grow the crop under glass protection throughout the season. In this case the plants are trained diagonally along a wire support. Suitable varieties include 'Harbinger,' 'Hundredfold,' 'Plumpton King' and 'Stonor's Moneymaker.' (Even with normal size cloches it is possible to give glass protection throughout the season if the plants are stopped at one or two trusses).

MARROWS

Sow in "60" pots in a heated greenhouse or hot-bed frame in the first or second weeks of March. Plant out under cloches about a month later, in generously manured beds. Give plenty of water and shade the cloches during hot, sunny weather. Varieties, 'Green Bush,' 'Table Dainty' and 'Custard' (Fig. 47).

SWEET CORN

Sow directly under cloches at the end of March to early April. Two rows can be sown under a cloche 22 inches wide. Thin out seedlings to stand 9 inches apart for the dwarfer early varieties and 12 to 15 inches for later and taller varieties. An intercrop of French Beans is sometimes sown at the same time. Varieties, 'John Innes,' 'Canada Cross' and 'Fogwills Early.

CUCUMBERS

Ridge or Frame varieties may be grown from seed sown *in situ* early in May under cloches or from plants raised from seed sown in pots in heat during early April and planted under cloches in the middle or end of May. Stop the plants at the 4th "true" leaf. Amongst Ridge varieties 'Hampshire Giant' and 'Perfection' give fine long fruits and may be planted 3 feet apart in the rows. 'Conqueror' is perhaps the best frame variety for Cloche growing and should be planted at least 4 feet apart in the rows. The frame type does not require fertilisation of the flowers in order to produce fruits and in fact it is advisable to remove the male flowers unless seed saving is desired. The male flowers should not be removed from the Ridge varieties as fertilization is essential for fruit formation in this case.

MELONS

Plants are best raised in a glasshouse or hotbed frame from seed sown in "60" pots in the third or fourth week of April. About a month later the plants should be planted over a good depth of manure or compost. After the plants have become well established stop them at the fourth "true" leaf. They may need watering especially until flowering and after setting. Retain all fruits after setting until they are about half the size of a golf ball or a little larger. Then remove all except two fruits per plant, choosing two about the same size. Cloches will need shading during the summer. Suitable varieties include 'Tiger,' 'Rock Prescott' and 'Dutch Net' (Fig. 48).

STRAWBERRIES

Plant first-year runners, taken from virus-free stock, in August or early September. A 22 inch wide cloche will accommodate two rows of plants spaced 9 inches apart with the plants set 9 inches apart in the rows, the rows being "staggered." Cover with cloches from late February or early March until all fruit is picked. Give extra ventilation during daytime when flowers in bloom to facilitate entry of bees, and again when fruit is ripe when shading may also be necessary. After fruiting remove one complete row of each pair and every other plant of the remaining row so that the plants finally stand in a single row, 18 inches apart. This is to enable the second year and larger plants to be cloched the next season. Variety, 'Royal Sovereign.'

FLOWERS

Sweet Peas.—This queen of annuals responds well to forwarding treatment by the aid of cloches. Seed may be sown directly under cloches in September, October or January, or plants raised from a September sowing in pots in frames may be planted under cloches in early spring, preferably January. January planted Lettuce seedlings make a successful intercrop for they are ready to cut before any serious interference with the Sweet Peas takes place. The cloches are normally removed in April and the plants allowed to grow on in the open.

Nigella, Calendula and many other hardy annuals produce early blooms if sown under cloches in September or early spring.

Bulbs.—Daffodils, Iris, Tulips, etc., will respond well to cloche protection. It is usual to delay cloching until the bulbs have made plenty of root and are, in some cases, showing some growth above soil level. It is important not to cloche too early as the plants may be too advanced in spring to permit of the removal of the cloches without incurring serious risk of frost damage. This contingency can be overcome by using any device which will enable the height of the cloche to be increased, as required.

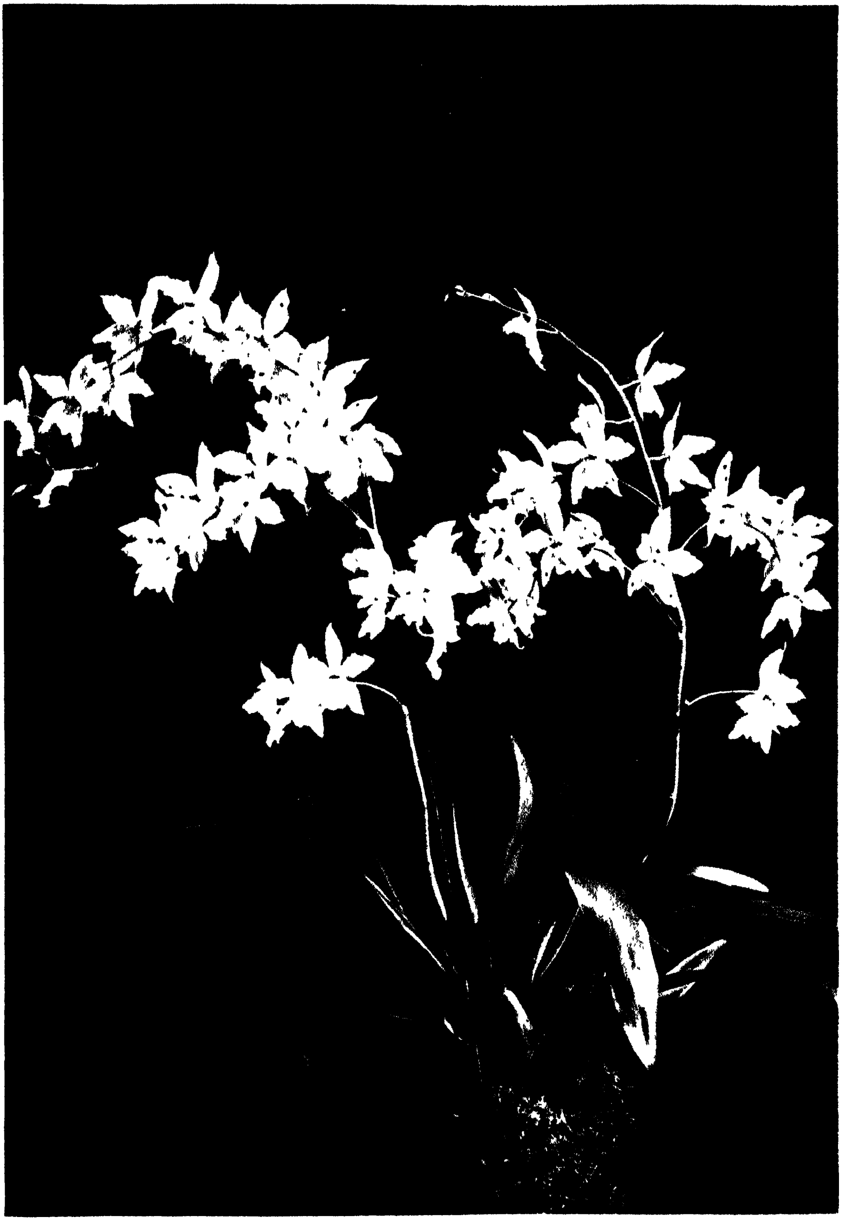
THE FLOWERING SHRUBS OF PALESTINE

By Captain Eric Hardy

THERE seems to be little doubt that in times past the Holy Land bore a more verdant flora that at present covers its bleak and stony hills, and that flowering shrubs and trees once covered much of the countryside in the manner which today sees them on some of the " maquis " or natural woodland, regaining growth from the destructive Turkish or Bedouin onslaughts made upon timber in years gone by. The flowering shrubs often bore such a special interest for us on our plant-collecting expeditions which covered so much of the country in recent years that the memory of them will linger long in one's recollections of this lovely land. Perhaps I should mention first the haunts where I found the wild-flowering shrubs at their best. I would recommend the dry wadis and hillsides in the vicinity of Deir es Sheikh in the mountains near Jerusalem: reached either by train from Jerusalem, or by car along the Hebron-road to about kilo 12, when one turns off to the right under a lonely archway along the road to El Khudr, one of the traditional sites of the tomb of St. George, for the winding road that leads past Allar Camp to the hills overlooking the railway from the south.

Here the hillsides are clothed with some particularly fine bushes of Strawberry Tree (*Arbutus Andrachne, L.*) and many fine pink-flowered shrubs of *Cistus villosus*, and the prickly yellow Broom (*Calactome villosa*), the lovely delicate green and cream Virgin's Bower (*Clematis cirrhosa*), wild Storax, and on the top of the hill the finest of all the Arbutus plants. The walk from the railway station through the wadi towards the distant Jaffa-road also takes one through the original native forest that is gradually growing up again, with some particularly fine flowering carobs bearing 3-inch long flower spikes, shrubs of *Pistacia palæstina* with separate stalks of rich red fruits and leaves not unlike our Mountain-Ash, and the Lentisk tree (*Pistacia lentiscus*) with smaller branches of red fruits. Here, as in so many dry wadis in Palestine, the blue-flowered Abraham's shrub (*Vitex Agnus-castus*) grows up into magnificent bushes several feet tall, and there is the white-flowered *Cistus salvifolius*, and in spring the lovely white Broom, the biblical ' Juniper,' *Retama Rhoetam.*

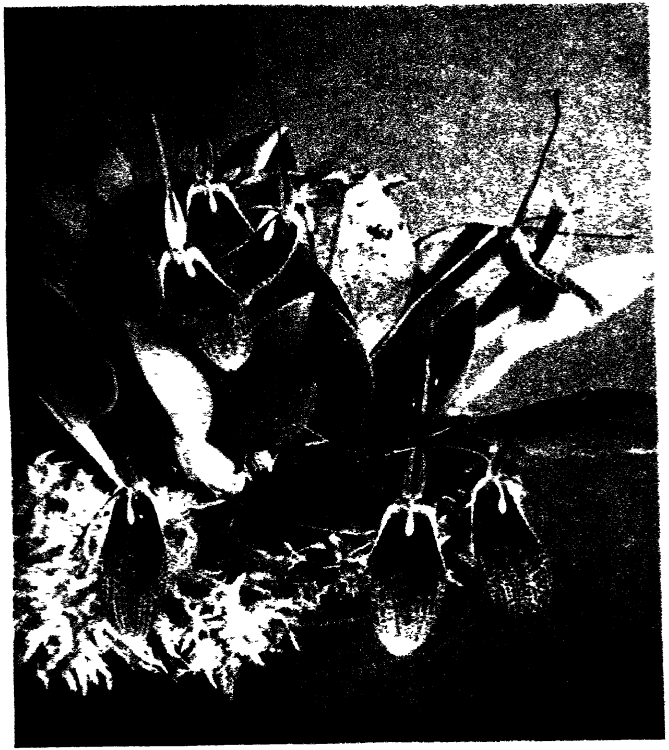
Then there is the wadi into the southern bluff of the Carmel, opposite Athlit, best reached by the motor road, via the railway crossing. Here in the vulture wadi grow fine bushes of thyme-leaved



Photo, R A. Malby.]

ORCHIDS FOR AMATEURS

FIG. 39.—ODONTOGLOSSUM 'THECLA'



Photos by late B J Beckton]

FIG. 40.—RESTREPIA MACULATA. COOL HOUSE ORCHID

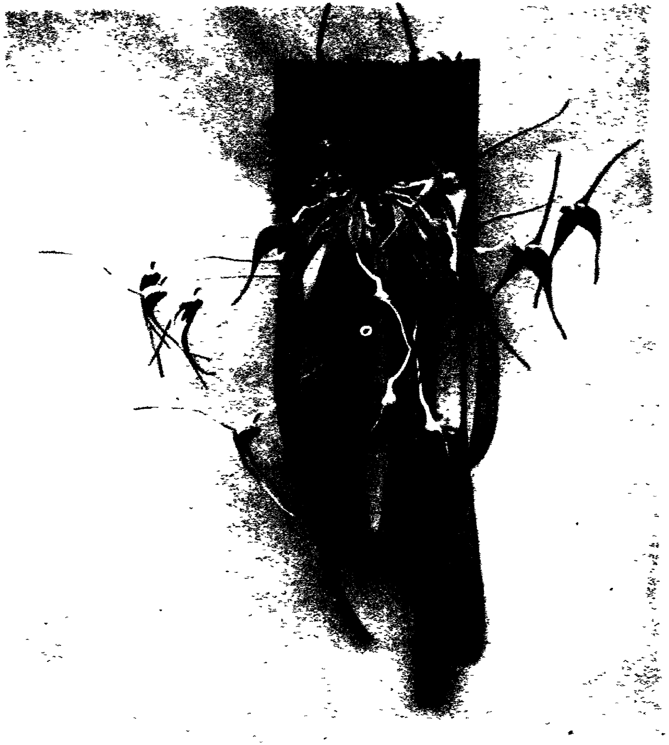


FIG 41.—MASDEVALLIA DEORSA. THE ONLY SPECIES OF THIS GENUS WHICH GROWS IN A DOWNWARD POSITION. A COOL HOUSE ORCHID

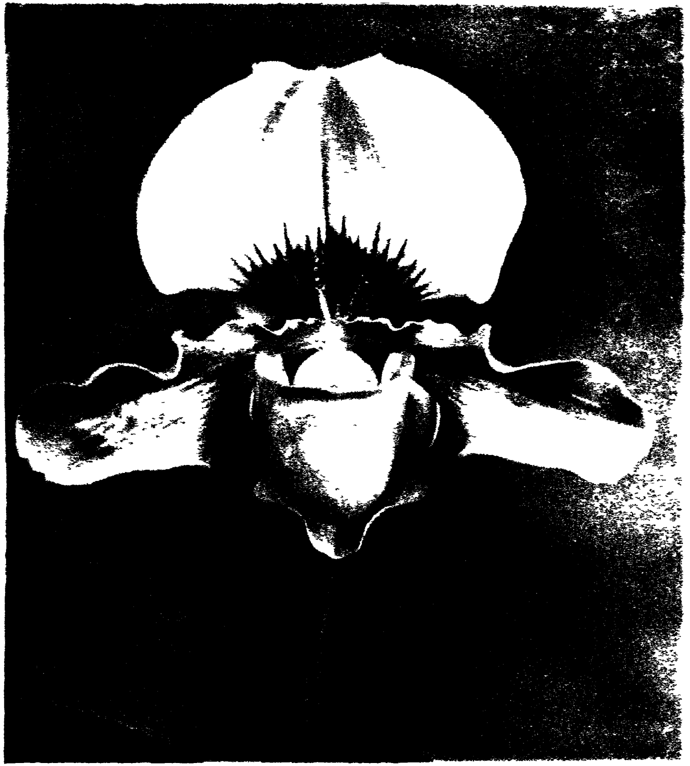


FIG. 42.—CYPRIPEDIUM 'GRACE DARLING.'

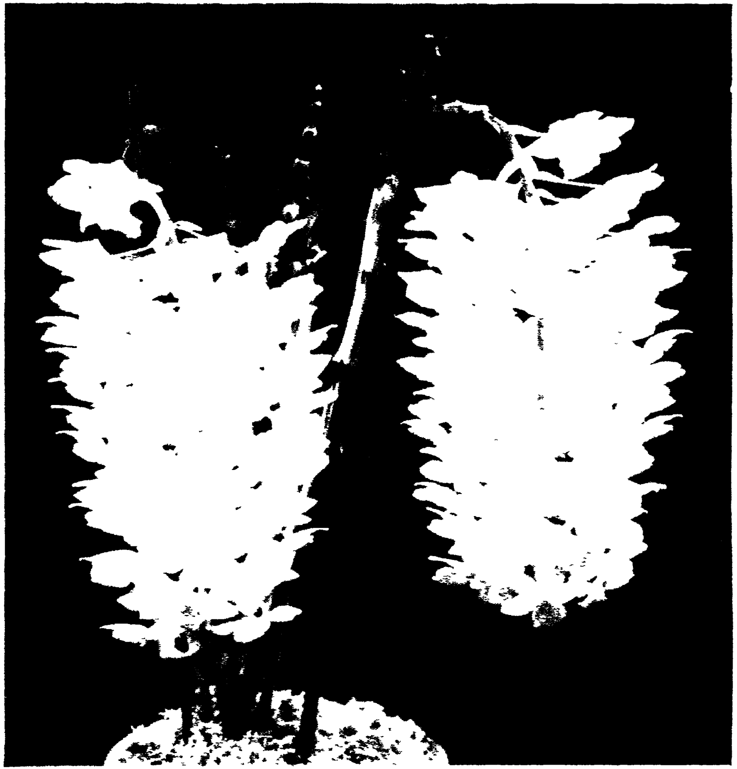
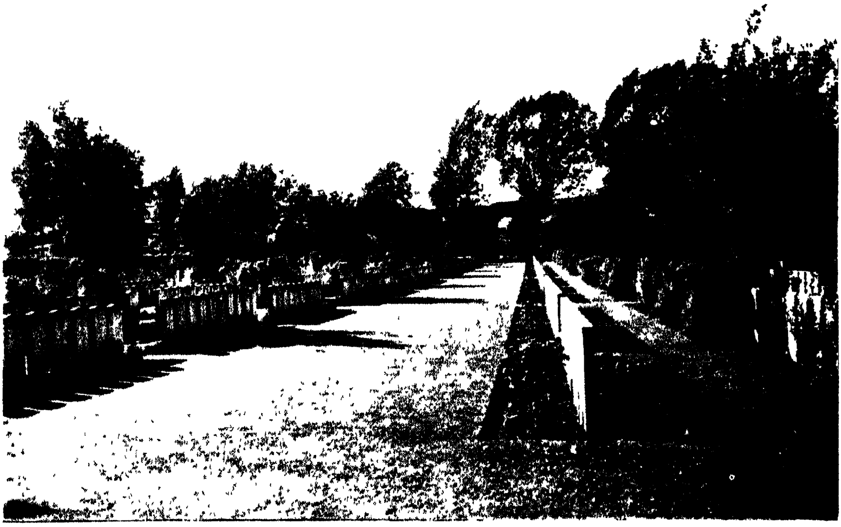


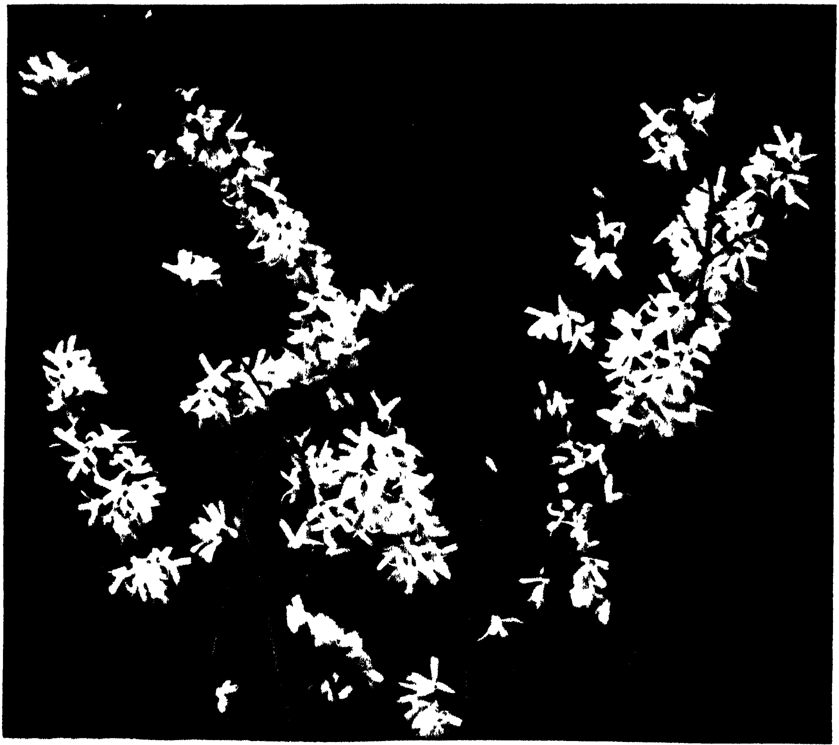
Photo R. A. Malby.

FIG. 43.—DENDROBIUM THYRSIFLORUM



PLANTING OF IMPERIAL WAR GRAVES COMMISSION IN NORTHERN EUROPE

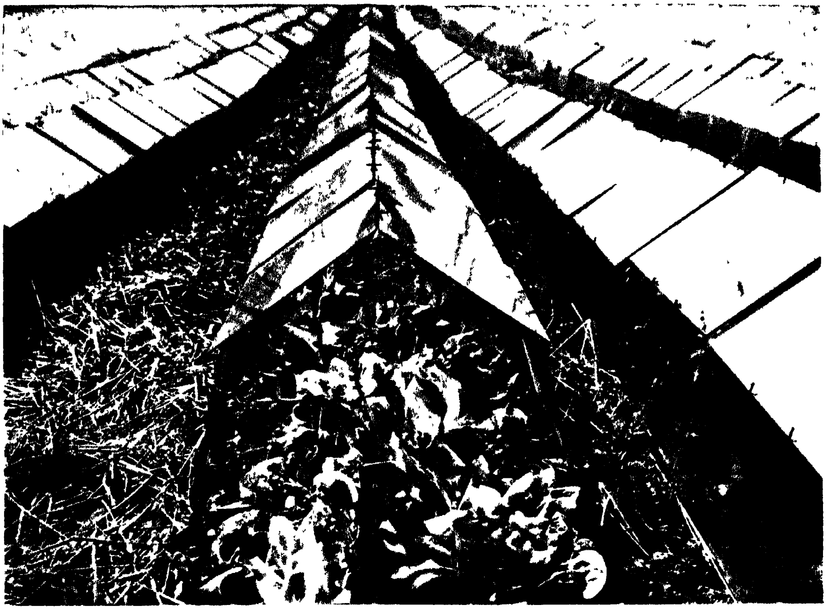
FIG 44.—WARLENCOURT, FRANCE. (See p. 105)



Photo, M. Amsler.]

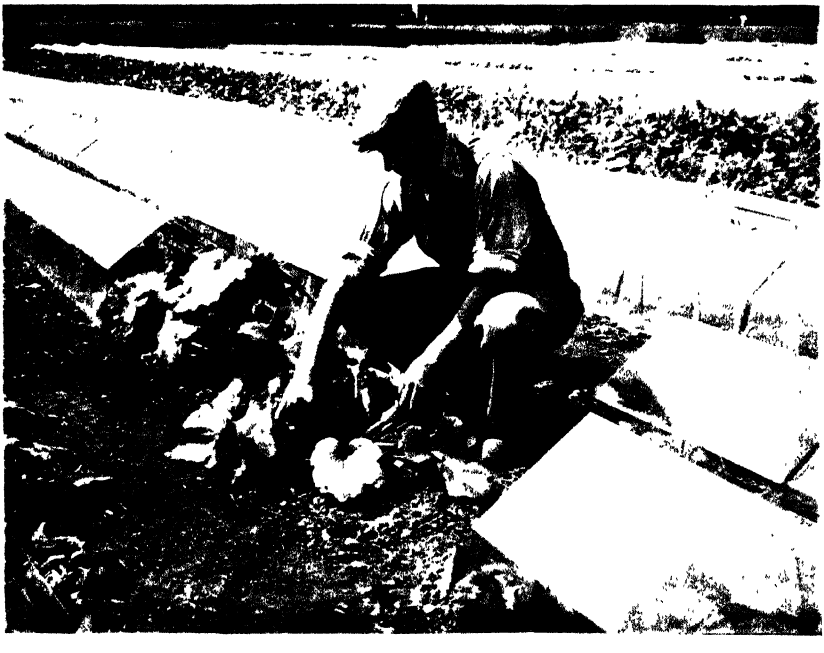
FIG. 45.—ABELIOPHYLLUM DISTICHUM

(See p. 110)



Photos Messrs. Chase]

FIG. 46.—PEAS ('LAXTON SUPERB') AND LETTUCE ('MAY KING') UNDER CLOCHES IN LATE MARCH. (EARLY SPRING CROPS IN ROTATION PLANNING)
(See p. 97)

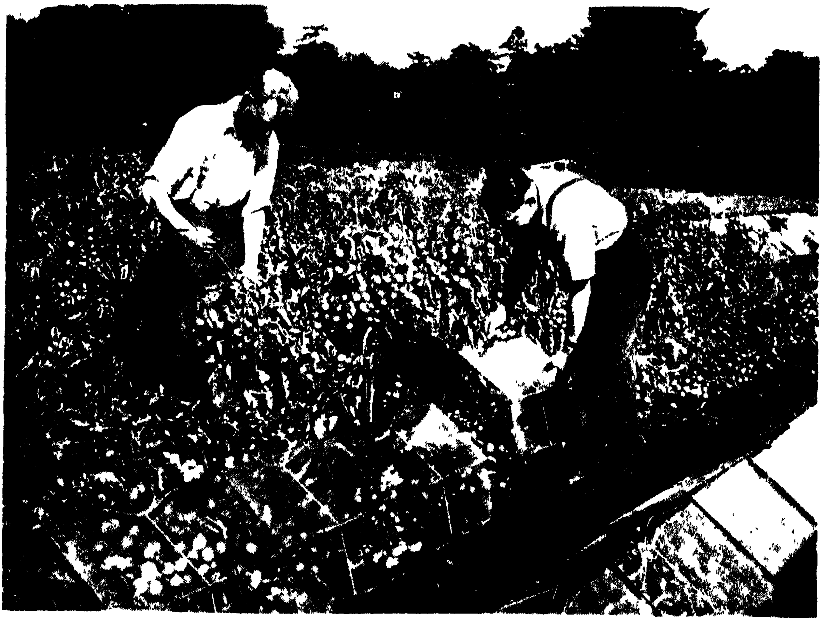


CONTINUOUS CLOCHE GARDENING

FIG. 47.—VEGETABLE MARROWS ('STONOR'S UNIVERSAL BUSH') UNDER CLOCHES ON MAY 17TH, 1946. (A LATE SPRING CROP IN ROTATION PLANNING)
(See p. 98)

Photos, Messrs Chase]

FIG. 48.—MELONS ('ROCK PRESCOTT') IN AUGUST 1946, THE CLOCHES HAVING BEEN TEMPORARILY REMOVED FOR PHOTOGRAPHING. (THIS IS ONE OF THE SUMMER CROPS IN ROTATION PLANNING.) (See p. 99)



CONTINUOUS CLOCHE GARDENING

FIG. 49.—RIPENING OFF LATE TOMATOES ('HUNDREDFOLD'). THE PLANTS ARE CUT AWAY FROM THEIR SUPPORTS, PARTIALLY DEFOLIATED, LAID ON PEAT-COVERED GROUND AND CLOCHED. (AN AUTUMN USE FOR CLOCHES.) (See p. 96)

PLANT COLLECTORS IN CHINA

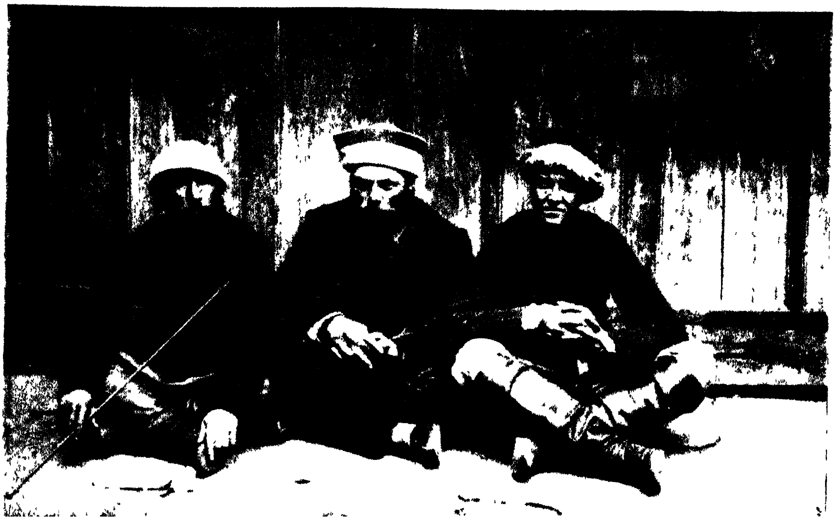
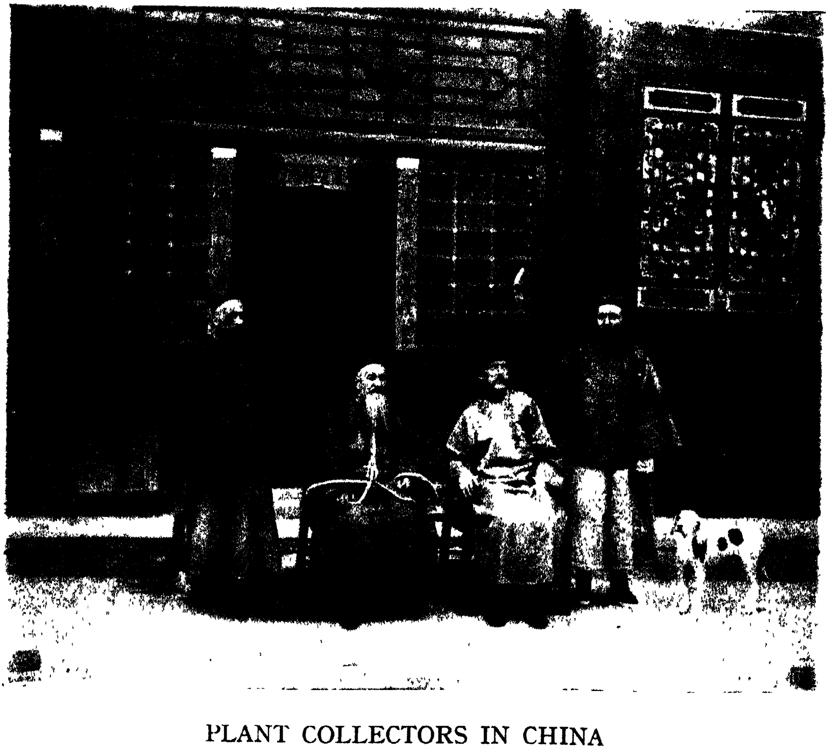


Fig. 51.—Père de Deken, Prince Henri d'Orleans, Gabriel Bonvalot, photographed by Pratt in Tatsien-lu on the completion of their magnificent journey from Siberia, through Chinese Turkestan and the great plateau of Northern Tibet.



PLANT COLLECTORS IN CHINA

Fig. 52.—Père Dejean, Bishop Biet, Père Jean André Soulié, and William Woodville Rockhill, photographed by Pratt in Tatsien-lu. Rockhill was the famous American explorer of Tibet.

St. John's Wort (*Hypericum serpyllifolium*) and probably the southernmost haunt of Laurel (*Laurus nobilis*), as well as *Lilium candidum* and the orange flowers of King's Spear (*Aspodeline lutea*), the fine bushes of *Stachys palestina*, the purple-tipped *Salvia Horminum* and the blue *Lupinus terminus*. The famous forestry at Bab el Wad may be reached 24 kilos straight down the Jerusalem to Jaffa road, at the end of the hills, or a better route for the plant-lover is to turn off at about kilo 10 and take the dusty road through Suba village and the hills at the back of Abu Ghosh to come out on the Beit Jibrin-road at the back of Bab el Wad. This forestry now has a goodly undergrowth of sub-shrubs growing on either side of the road, although for the less energetic, the south is more accessible with its pathways. Many, indeed, are the days we have spent plant hunting in the forest under its fine trees of *Pinus halepensis*, *Cupressus sempervirens* and carobs, wandering through sub-shrubs of pink Rest Harrow (*Ononis antiquorum*) and the curl-leaved St. John's Wort (*Hypericum crispum*), bushes of Rock-roses and Kermes Oak (*Quercus coccifera*), terebinths, with trailing evergreen growths of *Clematis cirrhosa*, Tamus and prickly *Smilax aspera*. The prickly green bushes of *Asparagus acutifolius* grow fairly commonly on the steep rocky slopes of the forest and, along the roadside, the abundant and fragrant yellow fuzz-balls of the Mimosa (*Acacia Farnesiana* (*L.*) WILLD. The forest has more Storax (*Styrax officinalis*), the red flower spikes of Common Summach or *Rhus corriaria*, and that peculiar member of the Oleaceae, *Phillyera media*. The quaint *Ephedra familiflori*s with its soft, pink, double fruit grows here too, fruiting in the early autumn. In mid winter the rich, wine-red berries of *Smilax aspera* make a beautiful decoration, but not until the spring do the bushes of *Cistus villosus* bear their papery pink flowers and the sage-leaved *Salvia salvifolia* its white ones. On the more open hillside around Bad el Wad in April the purple *Salvia judaica* flowers freely with a pleasant effect compared with the yellow Jerusalem sage, *Phlomis viscosa*, which often grows to great height here and at Deir es Sheikh.

I would recommend also a spring visit to the hillside above Tiberias for the flowering of the heavily-scented long-leaved Acacia bushes, or 12 or 14 kilometres down the Jerusalem-Jaffa road to turn off to the wooded hill overshadowing the settlement of Kiryeth Anavim, the "Valley of the Grapes." For here amongst haunts of wild Tulips and several Orchids and Arums, the pink and white Rock-roses again flower to perfection.

Now let us consider some of the shrubby plants of these haunts. On the dry hills in May and June the dense, oblong purple spikes of the Spike Thymbria (*Thymbra spicata, L.*) add much colour, for they develop woody stems and stand up strongly to the winds. They grow also in the open parts of Bab el Wad and on the Galilee hills, forming dwarf shrubs often with densely purple flowers massed together like Yorkshire Heather, attaining a height of about a foot. Shrubs of pink- and cream-flowered *Lantana camara* are cultivated commonly all over Palestine with a very pleasant effect, and in some places, like the hedgerows around Rehovot on the plain, they form several miles of wild hedge. In this district, as in several others, the highly fragrant Opopanax or *Acacia Farnesiana* is now widely used as a hedgerow shrub in place of the Prickly Pear (*Opuntia*), which was so popular in Turkish times. The floral effect is most pleasing and the fragrance wafted over the Orange groves by the wind is one of the pleasures of early summer, although, unfortunately, many visitors attribute it to the Orange Blossom.

Commonest of the spring shrubs is the prickly Caper (*Capparis spinosa, L.*) hanging its wide-opened, rose-like white flowers, with their large bunches of pink anthers, from most of the old walls and rock cliffs as far away as Mount Sinai, or as near town as the walls of Jerusalem. Its foliage, too, is a fresh green, almost an evergreen, which late in the year has the added adornment of ripe red fruits which the Arabs pickle in vinegar to eat with their meat. I have seen it in flower so late as the end of June near Bethlehem, while alongside the hill-road from Jerusalem to Bab el Wad grow some particularly fine bushes of this plant.

One of the most colourful scenes I ever witnessed was walking suddenly and unexpectedly upon a great bushy clump of the lovely purple-blue Syrian Catmint (*Nepeta curviflora*), just outside the wooded hill at Kiryeth Anavim in June, its glaucous, greeny-grey stems and foliage providing such pleasing background to the rich cymes and the plants growing so luxuriantly about three feet tall, that, for the moment, I did not recognise a fairly frequent flower which grows also on the Carmel, at the Cedars of Lebanon, and elsewhere. Late summer see the wadis of the head springs of the Jordan and many of its lower wadis pink with the profusion of blossom on the bushes of *Nerium oleander, L.*, the ' Rosebay ' of the east. Most beautiful in the lower Valley are the rose-pink expanses of these shrubs along the banks of the perennial stream that flows through Wadi Faria into the Jordan at Damiya bridge ; but some of the wadis we explored at the foothills of Hermon were thick with the pink blossom in July and August, attacked in places by the lovely green oleander hawk moth. Sometimes the flowers are white, but double forms are commonly cultivated in all the gardens, where it will grow twenty feet tall. Both wild and cultivated varieties are richly fragrant and flowers persist until October. At other times its long, narrow, leathery leaves afford much shade in a hot land. In the wild it normally grows to 8 or 12 feet, but in the courtyard of an Arab house below the Jaffa Gate at Jerusalem I saw a specimen with a stem 5 inches in diameter, a veritable tree. This, however, pales before a specimen which an American friend saw at Petra, in Transjordan, forty years ago, with a truck as thick as a man's waist, probably the largest Oleander in the Near East. Unfortunately it was chopped down for fuel in the recent war—*necessitas non habet legum !*

Lonicera etrusca, the Italian Honeysuckle, adds beauty to many of the hillside thickets and rocks near Jerusalem and Hebron (and the dusty roads from Hebron through the Judean hills to Beit Jibrin take one through some of the grandest little woodlands in central Palestine). Similar in effect to the purple spikes of *Thymbra spicata* on the spring hills are the purple tufts of wild Thyme (*Thymus capitatus*), which grow so freely in July on the hills near Hebron and are met with again on the sandy rocks of the coast above Majdal and below Jaffa, a lovely little sub-shrub for the rock garden. Mention has already been made of Abraham's Shrub (*Vitex Agnus-castus, L.*), the Chaste Tree, the traditional bush in which Abraham found the ram caught by its horns, whose two-lipped, purple corolla, borne on high flower spikes by woody and aromatic bushes, seems to be the only plant in the country with its leaves divided into five parts. Beside the road from Haifa, just before its reaches Acre, I measured bushes five feet tall in full flower at the end of July. *Nicotiana glauca* (R. GRAHM), the Tobacco tree, with tubular dull yellow flowers, whose loose trumpets quickly fall away when handled carelessly, is one of the non-native plants almost unknown fifty years ago which now thrives all over the country, from the shores of Haifa and Jaffa to the old city walls of Jerusalem, flowering all year through and frequently growing up into a tree 20 feet tall with stems 6 inches in diameter. Terminal panicles of flowers add a fair beauty when blooming in plenty, but I am not very keen on this plant in the garden.

Loveliest of the wild Flaxes of the hills, the buttercup-yellow *Linum mucronatum*, Bertol., and the pink *Linum pubescens* (RUXSS), although normally herbaceous, often develop a bushy habit a foot or more tall with most pleasing effect, for they rank amongst the most beautiful flowers of the late spring. The downy yellow Rest Harrow (*Ononis pubescens*), does this commonly with its bushy green foliage and bright yellow flowers, as does the big, pinky-maroon Judean Viper's Bugloss (*Echium judaicum*) on the roadside over the hills from Nazareth to Tiberias early in April, where its masses of bloom are a sight for lovers of colour, growing usually with the pink Flax. But when pressed and dried the Echium's flowers rapidly turn blue. These are flowers of the lower mountains and fields. *Ajuga chia*, the pretty little orange yellow bugle, adorns many a rocky hillside from Carmel to the Arabah desert south of the Dead Sea and especially around the hills by Lake Galilee.

A shrubby Rock-rose, bearing attractive small orange-yellow flowers, is *Helianthemum elipticum* (Desf.), (PERS.), which I collected on the dunes north of Hadera in November. There it was common. Bushy Fleabane (*Blumea chiosquarrides*), decks the banks of the ancient irrigation channel through the Wadi Kelt with its profusion of mauve composite flowers, and on the dry, hot hillsides there and overlooking the Dead Sea I found the rich orange flowers of the Indian Mallow (*Abutilon muticum*) (Del) WEBB., which grows again in that little tropical enclave at the south-east end of the Dead Sea, Es Safiyah. *Reseda lutea*, the yellow Mignonette, is commonly a bush or even a tree: indeed during our expedition through the Wadi Arabah from the Dead Sea to the Red Sea we ate our lunch under the shade of a 15-feet tall flowering tree of this Reseda, growing almost alone in the middle of this arid, almost sterile desert. But at that size it loses the beauty of its flowers and would need considerable pruning to bring it into pleasing effect.

I would add in conclusion that many of the flowering shrubs of Palestine are now growing in the little botanic garden at the Hebrew University on Mount Scopus, in their natural associations.

THE HORTICULTURAL PLANTING OF THE IMPERIAL WAR GRAVES COMMISSION IN NORTHERN EUROPE

By W. F. W. Harding, B.Sc. (Hort.)

I WANT in this article to give readers of this JOURNAL a brief survey of the Horticultural policy that the Imperial War Graves Commission is at this moment pursuing in Northern Europe. The work is now two-fold, in that there is the task of reclaiming into a high state of cultivation those cemeteries of the 1914–21 War, whose standard, in spite of the care bestowed on them by the peoples of the occupied countries, has necessarily had to deteriorate with the removal of the skilled staff who had been trained to the job, and also there is the preliminary horticultural work on the cemeteries of the war from which we have just emerged. Lest I should be misunderstood, I should like to make clear that most of the detail in this article refers to the 1914–21 War cemeteries since they are fully established, but by describing what has been done for these sites I hope to give an impression of the final development of the present war sites.

On many of the present war sites the Army has not yet finished all details of its registration, etc., work and in consequence they have not yet been handed over to the Commission. Even when they have been handed over the preliminary treatment is necessarily not the permanent treatment, since the latter is partly dependent on the architectural plan that is conceived. Consequently, on these present war sites, which the Commission has taken over, the treatment is as yet in Phase I, which consists of an attempt to bring some colour to the grave, even if only by the sowing of annual seeds and, if possible, the establishment of a turf which, should the architectural plans later demand, will either be lifted and used as turves or else turned into the ground for the humus it provides; its ultimate fate mainly depending on the quality of the seed mixture sown. As it becomes possible to embark on Phase II, which is the laying out for permanent landscape effect, so we may expect the horticultural principles developed between the wars by the Commission to become apparent. That is not to say that these sites will be treated in an exactly similar way to those of the 1914–21 War for the aim will be to achieve a degree of individuality adapted to the surroundings rather than the reproduction of a pattern, but certain broad principles are likely to be as important as heretofore.

The first difficulty with which the Commission is faced in the layout is the adjustment of ground levels and the preparation of the soil. Necessarily the soil has been much disturbed and there is much subsoil on the surface. If the permanent planting is to be a success, this subsoil must be returned to its correct place and either the top soil recovered or, if this is not possible, then top soil must be imported. At the same time levels must be adjusted to conform with the plan. This may and often does involve taking advantage of any existing irregularities in the surface of the ground to create terraced features, but where no striking irregularities are present the site is very often laid out to one clean sweep of turf interrupted only by the grave borders (Fig. 44). Although this stretch of turf may be somewhat sloping, we always seek to obtain the most regular slope possible in order that a restful effect may be created on the eye of the observer. The actual detailed level of the turf is an aspect of the work which demands and is given constant attention, and regular lifting and filling in of patches has to be carried out. This work is stressed for two reasons: first, because if it is not done it offends the eye, and secondly, because without it really clean good mowing is an impossibility. Considerable care is also taken that any grassed banks that are necessary are set out truly with boneing rods and at an angle that is not so steep that the grass is likely to suffer from drought in the summer. In a formal layout such as most of these sites assume the trueness of line of such banks is most important.

The preparation of the ground for sowing follows orthodox lines; on all but the larger sites treading of the soil to find the soft patches is considered an essential preliminary to the sowing. With regard to the seed mixtures used, except for certain exceptional cases, we are able to meet our requirements by the use of two—(1) a straight Fescue-Agrostis mixture, which is used when it is considered that it will be a success, and (2) a mixture substituting smooth stalked meadow grass and Crested Dog's Tail for the Agrostis with also the addition of a percentage of small clovers. It is found that this mixture, although naturally not productive of a bowling green turf, will present a decent green appearance under most trying soil conditions. In extreme cases we have had to add a percentage of Yarrow seed to obtain the all the year greenness which we strive for. The Fescue-Agrostis mixture needs somewhat less mowing but at the same time calls for all machines to be kept in a very sharp condition. Perennial Rye grass is never allowed in our mixtures.

With the inception of Phase II of the development of a site the individual mounds of earth over each grave are abolished and in their place two continuous borders are created. One we call the front border and one the back border. The front border is approximately two feet wide and the back border approximately one foot wide. This arrangement has the advantage that a decent wide grass bay can then be created between each row of headstones. To be thoroughly restful on the eye it has been found that for the average length of row this should be at least six feet in width.

The front border has for its main decoration a row of roses planted about three or four feet apart, wherever possible alternating with the headstones in order not to obscure the inscriptions. In the great majority of cases dwarf Polyantha varieties are employed in order that the most continuous display of bloom may be achieved. For this particular purpose the following varieties have been found particularly useful :—

' D. T. Poulsen.'
' Else Poulsen.'
' Joseph Guy.'
' Karen Poulsen.'
' Rhodatte.'
' La Marne.'
' Merveille des Rouges.'
' Poulsen's Yellow.'
' Orleans Rose.'
' Donald Prior '

Roses form the mainstay of this front border, both for traditional and sentimental reasons. Traditional because the rose is traditionally the flower of the English garden and in these cemeteries we seek to create pleasant restful English gardens on foreign soil rather than depressing burial places, and sentimental in the best sense of the word because there is no more appropriate memento for a mother or sweetheart, come on a long pilgrimage, to take away with her than a spray of roses from the grave of the mourned one.

Between the roses, and in front of the actual stone, we plant low-growing herbaceous plants, again mostly of kinds associated with our own gardens by affection and usage—Pinks, Violas, Catmint, Rock-roses, Campanulas, Tulips, Daffodils, Snow-drops, Grape-hyacinths, etc., ringing the changes on the vast selection that our gardens offer. All that we ask is that the plants shall be hardy and accommodating and not remiss in offering a wealth of blossom, for we must necessarily achieve the most colourful effect possible with the minimum amount of coddling. Annuals and biennials are, once we have entered the permanent phase, normally barred, for they do not fit in so well with the economy of labour about which we must be ever mindful since the maintenance is in perpetuity. Tall herbaceous perennials, such as Delphiniums and the taller varieties of Michaelmas Daisies, are but little used since they are altogether too vigorous for our purposes, although a very striking dwarf Aster, bred by a Mr. VOKES, a former Horticultural Officer of the Commission, is used to good effect. Sometimes also we employ an edging of some low-growing edging plant along the front of the whole front border. In the main, however, the effect we strive after is a simple unsophisticated one since this is in keeping with the effect desired for the whole cemetery which has for its key-note simplicity and beauty.

In the narrow borders behind the headstones, borders not necessarily associated with every row, are planted at intervals shrubby subjects. The purpose of these shrubs is to break up the visual effect of a large mass of headstones, a purpose which they achieve admirably. Occasionally pillar Roses are used in these back borders to achieve the same effect. The shrubs are not intended to reach a greater height than about five feet at the most or else the effect becomes overdone and in order to restrict them to this height and keep them adapted to such narrow borders without having to resort to murderous pruning, a very careful selection of the subjects used has to be made. Such shrubs as the *Lemoinei* hybrids of the Philadelphus genus, *Berberis Thunbergii atropurpurea, B. Wilsonae, B. Gagnepainii, Spiraea japonica* var. 'Anthony Waterer,' *Ceanothus* 'Gloire de Versailles,' *Cotoneaster Franchetti* and *Deutzia gracilis* have all been found amenable in a greater or lesser degree to this treatment and their graceful sprays over-topping the headstones achieve a very softening effect.

One final aspect of this border treatment which I think I must mention, although it may seem unimportant, is the preservation of the grass edges, upon which again great stress is placed. It is a small thing but has a considerable effect on the harmonious and well tended effect of the whole. These edges must be dead straight and the grass must be kept clipped back tightly to the edges which, to take the weight of the motor mower the better, must slope slightly out towards the border at the bottom.

I have now mentioned the levels, the turf and the back and front borders. To complete the picture of what we may expect to find as a constant feature in most cemeteries, I must now say a few words about the hedges and the trees. In some cases the boundaries of the site are formed by stone walls, but in many cases the boundary, apart from a low stone kerb, is a living one and takes the form of a well-clipped low hedge. These naturally vary somewhat in height to conform to the architecture, but a very usual height is about 4 feet 6 inches. By far the most useful plant employed is Hornbeam, which for this purpose seems to have every possible advantage. On calcareous soils this may be replaced by Beech. Hornbeam makes a very neat hedge fairly quickly, keeps its shape with one or two clippings per annum, forms a fairly dense screen to the wind and at any rate in the warmer localities holds its dead leaves right through the winter. Last, but not least, it has a pleasing appearance. Other hedging subjects used are Yew and Holly. For special features Yew is probably unsurpassed, but it does not form a hedge very rapidly and has been known to die out patchily in places on damp land. Holly, although very fine when successful, does not by any means come within the category of the easiest hedging plants, although once you have achieved your hedge you have a very pleasing feature. These hedges may often occur also within a large site—to break it up into smaller compartments and so avoid any bleakness. These internal hedges are, however, very often of more informal subjects, such as Lavender, Rosemary, *Berberis Wilsonae* and *stenophylla, Rosa rubrifolia,* etc.

Lastly, let me dwell for a few moments on the problems of tree planting on these sites, for on the framework of trees so much of the effect depends. The aim has been throughout to rely mainly on the smaller flowering trees, for two reasons: first, there is usually insufficient room for the ultimate development to their full majestic and impressive proportions of the more typical forest trees and, secondly, the pleasing and cheerful effect of the flowers is desired to prevent the creation of any suggestion of gloominess. Coniferous trees are not used to as great an extent as is usually found in cemetery practice on account of the sombreness of their foliage, but this is not to say that they are not employed at all. Experience has, however, shown that the most suitable trees are mostly found in the genera Pyrus, Malus, Prunus and Crataegus. No tree is more planted than the double red Thorn (' Paul's Scarlet '), which, both in its flowering and fruiting seasons, creates a lovely setting. That is, however, not to say that it has no faults. Many of the areas in which we must plant it are perforce very flat and windswept and under these conditions the very thick head which it produces presents such a resistance to the wind that it soon heels over at an angle unless its head is given a regular and pretty drastic thinning. Also in winter a sharp look-out must be kept for the webs of the tent moth caterpillars, for if these are not removed an infestation sufficient to strip a tree will very soon develop. This question of keeping trees plumbed to the vertical is one to which we give considerable attention, because very often the trees have been planted as part of an architectural design and consequently any irregularity looks very bad. In some exposed positions trees have to be lifted and re-orientated, through 180°, to offset the effect of the wind in causing one-sided development. Another very useful tree for our purposes is *Malus floribunda* and also its very close relative *Malus purpurea*. On selected sites the Japanese Cherries are used and form perhaps the most beautiful avenues of flowering trees that it is possible to obtain, but they are not so universally successful and healthy as the Thorns. Other trees of this class used are *Crataegus Crus-Galli*, *Prunus cerasifera* var. *Pissardii*, *P. Padus*, *P. avium* var. *flore pleno*, *Pyrus Aria* and *Pyrus Aucuparia*. The Mountain Ash (*Pyrus Aucuparia*) is a tree that is very suitable for our sometimes rather restricted spaces, and, for the effect of its masses of berries, is almost unsurpassed. This is used very considerably, but on the wetter soils it cankers badly and seems unhappy.

In the early years of the work a considerable amount of pleaching of Limes was done with the idea of forming screens to shut out the sight of ugly buildings on adjoining property. This type of work may be seen at its best in the public parks of Brussels, but with us it did not prove a very great success, due to the number of man-hours required to keep these pleached Limes neat and tidy. Consequently now few remain, for they have mostly either been replaced or by careful pruning have been changed over into free growing standard trees. Limes are not ideal for our purposes for they are rather strong growing, but where space allows they are very beautiful for, with the warmer continental summers, they flower much more prolifically than in England. *Tilia euchlora* and *T. tomentosa* are the most suitable species. The latter assumes a wonderful regular outline, but the branching is rather dense and needs considerable regulation.

The Chestnut is another tree which does very well on the continent. The most useful for our purposes is *Aesculus carnea* var. *Briotii*, the flowers of which are of very variable and beautiful shades of pink, apricot and carmine. *Catalpa bignonioides* is also used to a limited extent but the head grows very lopsidedly if exposed to a strong wind and the health of the trees appears often to deteriorate at rather an early age. *Paulownia tomentosa* (syn. *imperialis*) is an extremely beautiful tree of which there are some fine specimens in north-east France, and this may well be used by us in some future plantings.

Fastigiate trees are always useful to us, but the Lombardy Poplar seems still to be the most generally satisfactory one. Considerable efforts have been made to replace it by the Pyramidal Hornbeam and the Pyramidal Oak, but neither has been a very striking success. The former has been very subject to a bacterial die-back and the latter has usually not been robust enough to get a firm grip on life in the sometimes rather adverse conditions to which it has been subjected.

Of the Coniferous subjects, the Irish Yew (*Taxus baccata* var. *fastigiata*) has been invaluable for echoing features of the architectural design and we now have some very fine specimens. Other Conifers used in a similar manner are Cupressus (syn. *Chamaecyparis*) *Lawsoniana* vars. *erecta viridis* and *Allumii, Thuya plicata* and *Thuya orientalis, Juniperus chinensis* var. *Phitziriana* and *Juniperus Sabina*. The Junipers are largely planted in bastions for their spreading habit.

So many and diverse are the sites that we have to plant up that most of the hardier and less rare species of trees and shrubs are represented somewhere and so rather than seek to catalogue them I will rest content with having mentioned a few outstandingly useful species. Shrubs are also not only confined to the narrow back borders that I have mentioned, for in many places irregular corners and pieces of ground are filled in with mixed shrubberies in which we have been able to give the more vigorous Buddleias, Forsythias, Spiraeas, Diervillas, Philadelphuses, etc., a chance to display their worth.

One other aspect of the horticultural policy of the Commission that is deserving of mention is the effort that has been made, where any number of men from the Dominions were buried together, to reflect in a horticultural motif the land from which they came. Thus, on predominantly Canadian sites, we have usually sought to establish a selection of Canadian Maples such as *Acer dasycarpum, Saccharum, Negundo, macrophyllum*, etc. Similarly, where New Zealanders predominated, an extensive collection of species of shrubby New Zealand Veronicas was planted out, and on Australian sites experimental plantings of Eucalyptus trees were made. Along the walks of the South African Memorial at Delville Wood, the Oaks which are now making fine trees are the same that were raised from acorns specially sent from South Africa. These introductions of plants from warmer climates than our own have not always been uniformly successful, but even where there have been failures it has been well worth it for the sake of the successes, and we have thus been able to demonstrate, in an outward and visible form, the Imperial nature of the Commission.

Finally, I should as a newcomer to this organisation like to pay my tribute to the gardeners who in the past have wrought and cared for all this. These solitary British and Empire ex-servicemen, set in some little village in a foreign land, have become wedded to their charge, and if ever men deserved to be congratulated on the faithfulness of their service it is these men. Now they are striving to rebuild their life-work, so much of which perforce was toppled over, and if you should chance to visit these cemeteries and meet one of them at work then your word of appreciation will help repay that service and encourage him not to relent in the at present uphill task.

NOTES FROM FELLOWS

Plant-Hunting in China

SINCE the publication of my book there has come into my hands through the kindness of a member of the COCKBURN family a collection of photographs taken by A. E. PRATT during his travels in Szechuan in the years 1889 and 1890. While a number are of the Yangtze Gorges and of the country round Tatsien-lu, areas which have been frequently photographed since with more modern equipment, yet some are of historical importance. Mr. COCKBURN was the British Resident at Chungking during the period of PRATT's explorations, and *Primula Cockburniana* was called after him (Figs. 50–52).

As far as I can tell none of these photographs has been reproduced except that of PRATT in Chinese dress which was used as the frontispiece of his book *To the Snows of Tibet through China.*

E. H. M. COX.
Glendoick.

Abeliophyllum distichum

Abeliophyllum distichum, a native of Central Korea, though a distinct and extremely interesting species, is still very rare in gardens. It belongs to the family Oleaceae, which includes such plants as Lilacs, Privets, Fontanesia, Forsythias, Olearias, etc., and was first described by the Japanese botanist NAKAI, 1919. In 1924 it was introduced into America, but did not reach this country until some time later.

For taxonomic reasons the genus Abeliophyllum is placed by NAKAI and REHDER next to that of Fontanesia, but it has a four-lobed corolla instead of four separate petals, which fact places it closer to Forsythia, with which it also agrees in chromosome number. The name Abeliophyllum refers to the Abelia-like foliage and not to its affinity.

The plant received an Award of Merit when shown by Lord ABERCONWAY in 1937, and earned a First Class Certificate for Mr. J. COUTTS in 1944.

Unfortunately, Abeliophyllum is a slow grower which will never attain the stature of the Forsythias. The larger of my two plants in this Kentish garden has been planted out some six years, and is an open twiggy shrub of some 4 feet in height. The blooms, which appear in early February or even sooner are borne on well-ripened wood of the previous year and are about ¾-inch in diameter, sweet scented, and again remind one of Forsythias in their shape and axillary arrangement, but they are white with a trace of yellow in their centres (Fig. 45).

The calyces and unopened buds are of a reddish-brown hue which contrasts well with the fully opened inflorescence.

We are told that this plant has withstood 12° below zero in America, so there is no need for anxiety as to its hardiness.

Propagation of half-ripe wood under bell glass in July is recommended. Personally I have found cuttings difficult, but possibly my own attempts were made too early in the season.

We have here a very hardy, easy-going plant, happy in full sun or half shade, flowering regularly every February and sweet scented withal.

Surely a valuable addition to our slowly increasing list of winter-flowering shrubs. MAURICE AMSLER.

Embothrium coccineum Forster

Among Chilean plants, grown in England, **Embothrium coccineum** Forst. seems to take an exceptional place because of its difficulty in cultivation.

Lord ABERCONWAY reports that his plants withstood 34 degrees of frost (JOURNAL R.H.S., 1945, p. 191), but in many localities in England **Embothrium** is not hardy (1945, p. 256). This is the more astonishing as in its native country Chile, in the southern part of which **Embothrium** occurs on the Continent as well as on the isles, the climate is rather rough and for part of the year low in temperature. The plant is even said to occur on the isle of Tierra del Fuego (1945, pp. 289, 317). The writer collected flowering specimens of about 10 feet high in November 1937, near Validiva (altitude 45 feet), but in the coastal mountains —Cordilleras de Nahuelbuta—and in the region of Villarica, both north from Valdivia, **Embothrium** was found at an altitude of 4,000 feet as can be seen from the literature.

In Chile **Embothrium** has a wide range, extending between latitudes 35° (35° 50′) and over 53° South. The area is characterized by a high degree of humidity, exposure to heavy storms especially as far as the coastal region is concerned and a temperature decreasing from north to south.

For Talca, just north of the northern limit of Embothriums area in Chile, an annual rainfall has been reported of about 21 inches, Valdivia (lat. ± 40°) has 108 inches, Puerto Montt (lat. ± 41°) 101, Ancud (lat. ± 41°) on the isle of Chiloé 94 inches a year. Punta Arena (lat. ± 53°) has only ± 15 inches, but it is situated on the Atlantic side of the country ; corresponding localities on the Pacific side have far more rain (perhaps 50–60 inches ?). According to *The Times Atlas* and the literature a great many parts of the British Isles have an annual rainfall of 25–60 inches, Liverpool (lat. ± 53° north) has 30 inches.

As to the temperature we can say that the mean temperature of the year is : Talca 56° F., Valdivia 53°, Puerto Montt and Ancud 51°, Punta Arenas in the extreme south of the area 42°, while in Great Britain the annual temperature moves between 44 and 52° F. in a great many parts of the country; Liverpool has ± 50° F.

Summer-winter fluctuations of temperature are not slighter in England than they are in Embothrium's Chilean area, as can be derived from the mean summer- and winter-temperature of the mentioned localities. Talca 70–45° F., Valdivia 61·5–45°, Puerto Montt 58–45°, Ancud 56–46°, Punta Arenas 50–35°, British Isles 55 (62)–38 (44)°, Liverpool 61–40° F.

With regard to hardiness it is interesting to know something about extreme temperatures occurring in wintertime. In Valdivia 25·5° F. was measured as thus, in Punta Arenas 20° F. (observations within a four years period only), in South England and South Ireland between 14 and − 4° F., so that extremes in the British Isles are likely to be lower than in Chile. It is, however, a well-known fact that temperature depends on elevation and in respect of differences in elevation occurring in Chile it is of interest to know that somewhat north from Punta Arenas a temperature below − 20° F. has been recorded at an altitude of several hundred metres. (I was not able to trace the exact altitude from literature.) As to degrees of frost in the British Isles in localities where **Embothrium** is cultivated, JOURNAL R.H.S. 1945, p. 256, reports extreme temperatures of 26° and 34° of frost.

In a preceding paragraph we pointed to Liverpool because it is on the same latitude on the northern hemisphere as is Punta Arenas in the south. But we have to consider the well-known fact that weather conditions in parts of Europe (*i.e.* England) are more favourable than they are in the Chilean region at corresponding latitudes. Thus we may expect that **Embothrium** can be grown in England even north from Liverpool.

Many taxonomists (the writer among them) have their doubts about the narrow-leafed **Embothrium lanceolatum** of Ruiz and Pavon being a species, but in the extended area there may occur different forms or even varieties.

Considering the wide expanse of this area, the differences in climate, exposure and elevation of various of its regions we feel inclined, as does W. BALFOUR GOURLAY (JOURNAL R.H.S. 1945, pp. 317–318), to take the situation of the regions of origin of the material as an important factor on which hardiness of **Embothrium coccineum** in the British Isles for a great deal depends.

Port Famine and Cirnelillo (not located by W. BALFOUR GOURLAY) are of interest: Port Famine as it is situated in the very south of Embothrium's Chilean area, south-west from Punta Arenas at latitude nearly 54° South, and Cirnelillo as probably it is not a geographical name but a vernacular and incorrectly written one. We only have to turn the "n" upside down and we find the word "ciruelillo," which is a well-known Chilean synonym for **Embothrium coccineum.**

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WISLEY TRIALS, 1946

DAHLIAS AT WISLEY, 1946

TWO hundred and seven varieties of Dahlias were grown in the trials at Wisley ; of these one hundred and thirty-four were grown for the first time, having been selected for trial by the Joint Committee of the Royal Horticultural Society and the National Dahlia Society in 1945, the remainder being grown for future judgment or comparison, most of which had received Awards in previous years.

The trials included most of the well known Bedding varieties, which included the Mignons. The Joint Committee made their recommendations for Awards on August 22 and September 4, 1946, and the report indicates to which class the new varieties were assigned, the varieties retained for future judgment and those deleted from the trials.

The National Dahlia Society did not award a Gold Medal in 1946.

SINGLES

Princess Marie Jose (sent by Mr. Stuart Ogg, The Grove Nurseries, Swanley, Kent). **A.M.** August 22, 1946.—2 feet, of bushy habit. Flowers single, 5 inches diameter ; florets very broad, flat, tips blunt, reflexed, Persian Rose (H.C.C. between 628 and 628/1) ; disc golden-yellow ; free and erect, on 9- to 12-inch stalks, well above the foliage.

The following variety has been retained for future judgment : PERPLEX (Maarse).

MIGNON

Busby Gem (raised by Messrs. Torrance & Hopkins, Meadow Nurseries, Busby, nr. Glasgow and sent by Messrs. Brown & Such, Ltd., The Royal Berkshire Nurseries, Maidenhead, Berks). **H.C.** August 22, 1946.—1½ feet, of compact bushy habit. Flowers single, 3¾ inches diameter, Dresden Yellow (H.C.C. 64) ; florets broad, blunt, reflexed at tips, disc golden-yellow, very free on erect 4 to 8 inch stalks, well above the foliage.

The following varieties have been retained for future judgment : SHIRLEY WHITE (Woolman), SHIRLEY YELLOW (Woolman), FAIRY (Armstrong), PINK COLTNESS (Woolman), GRACE AFFLECK (Brown & Such), SEEDLING 43/15 (Carlée), PAISLEY GEM (Ogg), GRAPPENHALL (Ogg).

The following varieties have been deleted from the trials : L'INNOCENCE (H.C. 1926), SWANLEY WHITE, BUTTERFLY, MAROON GEM.

ANEMONE-FLOWERED

The following variety has been retained for future judgment : SIEMEN DOORENBOS (Ballego.)

The following variety has been deleted from the trial : ROODE ZON.

SMALL-FLOWERED PAEONY

The following variety has been retained for future judgment : JOHN JAMES (Treseder).

DWARF PAEONY-FLOWERED

Mrs. Musgrave Hoyle (raised and sent by Messrs. E. F. Fairbairn & Sons, Carlisle). **H.C.** August 22, 1946. 2 feet, of compact, bushy habit. Flowers semi-double, 4 inches diameter, Orient Red (H.C.C. 819); florets flat, blunt, broad; disc golden-yellow, free and erect, on 8- to 12-inch stalks, well above the foliage.

The following varieties have been retained for future judgment: HILDA (Jarman), MRS. J. T. JEFFERY (Austin).

The following variety has been deleted from the trial: SHIRLEY ORANGE.

LARGE INFORMAL DECORATIVE

Burnet (raised and sent by Messrs. J. Stredwick & Son, Silverhill Park, St. Leonards-on-Sea). **H.C.** September 4, 1946.—5 feet. Flowers 7 inches diameter, dull blood-red, tipped white; florets broad, pointed; free and erect on stiff 18- to 22-inch stems, above the foliage.

Red Guard (raised and sent by Messrs. de Ruyter Bros., Oegstgeest; Holland). **H.C.** September 4, 1946.—3½ feet. Flowers 8 inches diameter, Signal Red (H.C.C. 719/1); florets broad, flat, pointed, free and erect on stiff 8- to 12-inch stalks, well above the foliage.

Sheila Downey (raised and sent by Messrs. J. Stredwick & Son, Silverhill Park, St. Leonards-on-Sea). **H.C.** September 4, 1946.—4 feet. Flowers 8½ inches diameter; florets long, broad, flat and twisted, Sulphur Yellow (H.C.C. 1/2) deeper towards the base, reverse silvery-white, free and erect, on stiff 12- to 18-inch stalks, above the foliage.

The following varieties have been retained for future judgment: : ADMIRAL (Van Oosten), CEASE FIRE (Stredwick), AMBER QUEEN (Stredwick), MARION TATE (Stredwick), EDITH MORELL (Stredwick), MACKENSIE (Stredwick), SEASHELL (Stredwick), MIDNIGHT (Stredwick), TYNE (Brown & Such), COLONEL W. M OGG (Ogg), EVELYN OGG (Ogg), CHARLOTTE COLLINS (Ogg), DOROTHY TATTAM (Barnes), LILA TRIOMF (de Ruyter).

The following varieties have been deleted from the trials: BUTTERCUP, ARISTOS, HERBERT BROWN, LION, TOPAZ.

MEDIUM INFORMAL DECORATIVE

Craigpark Gem (raised by Mr. R. M. Grier, introduced and sent by Messrs. Carter Page & Co., Ltd., London Wall, London, E.C.). **A.M.** August 22, 1946.—3½ feet. Flowers 5 inches diameter; florets broad, flat, Orient Red (H.C.C. 819/1) with a golden sheen, very free and erect on 12- to 14-inch stalks, above the foliage.

Firefloat (raised and sent by Messrs. Brown & Such, Ltd., Maidenhead, Berks). **A.M.** September 4, 1946.—4½ feet. Flowers 5 inches diameter; florets flat, curled at tips, pointed, very broad, Dutch Vermilion (H.C.C. 717/1), free and erect, on stiff 10- to 14-inch stalks, well above foliage.

Piet (raised by Czernicki-Carlée, introduced and sent by Messrs. H. Carlée, Haarlem, Holland). **H.C.** September 4, 1946.—4½ feet. Flowers 6½ inches diameter, Orient Red (H.C.C. 819); florets broad, flat, pointed, free and erect, on 12- to 20-inch stalks, above the foliage.

Diamant (raised and sent by Messrs. J. van Oosten, Gravenhage, Holland). **H.C.** September 4, 1946.—3½ feet. Flowers 5 inches diameter; florets flat, broad, pointed, orange-salmon base yellow, magneta on reverse of florets showing through, free and erect, on 10-inch stalks, above the foliage.

The following varieties have been retained for future judgment: TRITOMA (Stredwick), PERRAN (Brown & Such), LADYBIRD (Stredwick), MANDARIN (Stredwick), YSELMEER (Carlée), MYSTIC (Stredwick), F. WILSON (Woolman), O. J. PRINCE (Woolman), ORANGE TRIOMF (de Ruyter).

The following varieties have been deleted from the trial: EUREKA, TANTE STEIN (**A.M.** 1938), VICTOR (**A.M.** 1938).

SMALL-FLOWERED INFORMAL DECORATIVE

Brightness (raised and sent by Messrs. J. Stredwick & Son, Silverhill Park, St. Leonards-on-Sea). **A.M.** September 4, 1946.—Described R.H.S. JOURNAL, **71**, 109. (**H.C.** 1945.)

Marjoleyn (raised and sent by Messrs. J. G. Ballego & Sons, Leiden, Holland). **H.C.** August 22, 1946.—3½ feet. Flowers 3½ inches diameter; florets broad, flat, blunt, Phlox Pink (H.C.C. 625) amber at base, very free and erect, on 8- to 12-inch stalks, well above the foliage.

Peach Glow (raised and sent by Mr. J. F. Barwise, Towneley Nurseries, Burnley, Lancs). **H.C.** September 4, 1946.—3½ feet. Flowers 4½ inches diameter; florets pointed, semi-quilled, Buttercup Yellow (H.C.C. 5/1) ground, very heavily suffused orange-salmon, free and erect, on 10- to 14-inch stalks, well above the foliage.

The following varieties have been retained for future judgment: FUZEE (Woolman), ROSALIND BARNES (Woolman), WILD ROSE (Woolman), SUNBURN (Brown & Such), SPRITE (Brown & Such).

The following varieties have been deleted from the trial: ORANGE BEACON, PICTORIAL (**A.M.** 1942).

DWARF INFORMAL DECORATIVE

Braywick Charm (raised and sent by Messrs. Brown & Such, Ltd., Maidenhead, Berks). **H.C.** August 22, 1946.—1½ feet, of compact, bushy habit. Flowers double, 3½ inches diameter, very freely borne, Carrot Red (H.C.C. 612) with a very faint pink shading, erect on- 5 to 7-inch stalks, above the foliage.

Brentwood Bedder (raised by the late Mr. J. T. West and sent by Mr. Stuart Ogg, The Grove Nurseries, Swanley, Kent). **H.C.** August 22, 1946.—22 inches, of compact bushy habit. Flowers double, 4 inches diameter, Orient Red (H.C.C. between 819 and 819/1), free and erect, on 4- to 7- inch stalk, above the foliage.

Park Beauty (sent by Mr. Stuart Ogg, The Grove Nurseries, Swanley, Kent). **H.C.** August 22, 1946.—1½ feet, of compact, bushy habit. Flowers double, 3½ to 4 inches diameter, Indian Orange (H.C.C. 713/1), free and erect, on 6- to 8-inch stalks, above the foliage.

Windermere (raised and sent by Mr. H. Woolman, Sandy Hill Nurseries, Shirley, nr. Birmingham). **H.C.** August 22, 1946.—2 feet, of compact, bushy habit. Flowers 3½ inches diameter, double, Tyrian Rose (H.C.C. between 24/1 and 24/2) very heavily shaded golden-apricot, free and erect, on 7- to 9-inch stalks, well above the foliage.

The following varieties have been deleted from the trial: BRAYWICK BEDDER, BRAYWICK FANCY, DOBBIE'S BEDDER.

LARGE FORMAL DECORATIVE

The following variety has been retained for future judgment: WOODLAND'S WONDER (Ogg).

MEDIUM FORMAL DECORATIVE

Firetail (raised and sent by Messrs. J. Stredwick & Son, Silverhill Park, St. Leonards-on-Sea). **H.C.** September 4, 1946.—4 feet. Flowers 5 inches diameter, Sulphur Yellow (H.C.C. 1) overlaid with Cherry Red (H.C.C. 722), base of florets yellow, free and erect, on 18-inch stalks, above the foliage.

Golden Leader (introduced and sent by Messrs. Fa. D. Bruidegom, Baarn, Holland). **H.C.** September 4, 1946.—4½ feet. Flowers 5¾ inches diameter, Aurolin (H.C.C. 3/1), inner florets Aurolin (H.C.C. 3) and Lemon Yellow (H.C.C. 4), free and erect, on 12- to 15-inch stalks, above the foliage.

The following variety has been retained for future judgment: MOONFLOWER (Barnes).

The following variety has been deleted from the trials: MICKY ROONEY.

SMALL-FLOWERED FORMAL DECORATIVE

Heron (raised and sent by Messrs. J. Stredwick & Son, Silverhill Park, St. Leonards-on-Sea). **H.C.** September 4, 1946.—3¾ feet. Flowers 3 inches diameter, white, edged Cyclamen Purple (H.C.C. 30/2), inner florets of a paler shade, free and erect, on 10- to 12-inch stalks, well above the foliage.

The following varieties have been retained for future judgment: ART (Woolman), JESTER (Stredwick), WATERLILY (Stredwick).

DWARF SMALL-FLOWERED FORMAL DECORATIVE

Maureen Creighton (introduced and sent by Messrs. E. F. Fairbairn & Sons, Carlisle). **A.M.** August 22, 1946.—22 inches, of very compact, bushy habit. Flowers 3½ inches diameter, Blood Red (H.C.C. 820), very free and erect, on 6- to 9-inch stalks, well above the foliage.

SHOW

The following variety has been retained for future judgment: JOYFULL (Brown & Such).

POMPON

Leo (raised and sent by Messrs. Brown & Such, Ltd., Maidenhead, Berks). **A.M.** September 4, 1946.—Described R.H.S. JOURNAL, **70**, 35. (**H.C.** 1944.)

Apiary (raised and sent by Messrs. Brown & Such, Ltd., Maidenhead, Berks). **H.C.** September 4, 1946.—3½ feet. Flowers 2 inches diameter, Blood Red (H.C.C. 820/1), free and erect, on 6- to 10-inch stalks, well above the foliage.

Elegy (raised and sent by Messrs. J. Stredwick & Son, Silverhill Park, St. Leonards-on-Sea). **H.C.** September 4, 1946.—3¾ feet. Flowers 1¾ to 2 inches diameter, Lemon Yellow (H.C.C. 4/1) shaded Scarlet (H.C.C. 19/1) at the tips, free and erect, on 6- to 9-inch stalks, above the foliage.

Vicki (raised and sent by Messrs. Brown & Such, Ltd., Maidenhead, Berks). **H.C.** September 4, 1946.—4½ feet. Flowers 2 inches diameter, Blood Red (H.CC. 820/1) shaded bronze, free and erect, on 6- to 12-inch stalks, well above the foliage.

The following varieties have been retained for future judgment: ANNE LISTER (Lister), MODETTE (Brown & Such), UNIT (Stredwick).

The following varieties have been deleted from the trial: ALLOWAY (**H.C.** 1939), DICK (**H.C.** 1932), PAULINE GIBBARD (**H.C.** 1938), REDSKIN.

LARGE SEMI-CACTUS

The following varieties have been retained for future judgment: CONQUEROR (Carlée), BETTABRACHT (Brown & Such), BEVRYDING (Carlée), BARRY COTTER (Brown & Such), GOLDEN WEDDING (Brown & Such), NIRWANA (Carlée), NORMAN (Stredwick), SEARCHLIGHT (Stredwick).

The following varieties have been deleted from the trial: HELIOS, ORANGE NASSAU (Ballago), REVE (Carlée).

MEDIUM SEMI-CACTUS

Mayfair (raised and sent by Messrs. J. van Oosten, Gravenhage, Holland). **A.M.** September 4, 1946.—3½ feet. Flowers 6 inches diameter, Saffron Yellow (H.C.C. 7/1), inner florets suffused Saturn Red (H.C.C. 13/1) at base of florets, free and erect, on 4- to 9-inch stalks, above foliage.

Dorothea's Orange (raised and sent by Messrs. G. Derudder & A. Toebaert, Ghent, Belgium). **H.C.** September 4, 1946.—4½ feet. Flowers 6 inches diameter, Orange (H.C.C. 12/1) suffused with Fire Red (H.C.C. 15/1), inner florets of a darker shade, free and erect, on 12- to 14-inch stalks, well above the foliage.

Elfin (raised and sent by Messrs. J. Stredwick & Son, Silverhill Park, St. Leonards-on-Sea). **H.C.** September 4, 1946.—4 feet. Flowers 6 inches diameter, at tips of florets Camellia Rose (H.C.C. 622/2), shading to Barium Yellow (H.C.C. 503/1) at base, free and erect, on 12- to 18-inch stalks, above the foliage.

Jo Blaauw (raised and sent by Messrs. J. G. Ballego & Sons, Leiden, Holland). **H.C.** September 4, 1946.—3¾ feet. Flowers 6 inches diameter, at tips of florets Neyron Rose (H.C.C. 623), suffused apricot towards the base, free and erect, on 18- to 22-inch stalks, well above the foliage.

Peach Queen (raised and sent by Mr. J. F. Barwise, Towneley Nurseries, Burnley, Lancs.). **H.C.** August 22, 1946.—4 feet. Flowers 5½ inches diameter, orange-salmon overlaid with golden-yellow at the base of the florets, free and erect, on 4- to 10-inch stalks, well above the foliage.

Radius (raised and sent by Messrs. J. Stredwick & Son, Silverhill Park, St. Leonards-on-Sea). **H.C.** August 22, 1946.—4 feet. Flowers 5½ to 6 inches diameter, Cherry (H.C.C. 722/2) shaded gold at the base of the florets, free and erect, on 18- to 22-inch stalks, well above the foliage.

Sweetness (raised and sent by Messrs. Brown & Such, Ltd., Maidenhead, Berks). **H.C.** September 4, 1946.—4¾ feet. Flowers 5½ inches diameter, Cherry (H.C.C. 722/2); free and erect, on 10- to 16-inch stalks, above the foliage.

Torch (raised and sent by Mr. J. F. Barwise, Towneley Nurseries, Burnley, Lancs.). **H.C.** August 22, 1946.—3½ feet. Flowers 5½ inches, Azalea Pink (H.C.C. 618/1), base of petals Lemon Yellow (H.C.C. 4/2), tips darker, free and erect, on 12- to 17-stalks, above the foliage.

Tritone (raised and sent by Messrs. Brown & Such, Ltd., Maidenhead, Berks). **H.C.** August 22, 1946.—4½ feet. Flowers 5½ inches diameter, Vermilion (H.C.C. 18), inner florets overlaid Lemon-Yellow (H.C.C. 4/1), free and erect, on 6- to 10-inch stalks, above foliage.

The following varieties have been retained for future judgment: BARBARA BROWN (Brown & Such), DAILY DELIGHT (Brown & Such), ROSARIO (van Dyck), PREFERENT (Maarse), MORIO (van Dyck), GOLLY (van Dyck), SUNBEAM (Barwise), STATELY (Barwise), VALOUR (Stredwick), ELIZABETH BROWN (Brown & Such), ZONNEGLANS (Bruidegom), LYRICK (Ballego), JEAN BAXTER (Lister), RUSSETT (Brown & Such).

The following varieties have been deleted from the trial: ELSIE, DUVELTJE, MOTHER BALLEGO, SHEIK, LILANA.

SMALL-FLOWERED SEMI-CACTUS

Kennet (raised and sent by Messrs. Brown & Such, Ltd., Maidenhead, Berks). **A.M.** September 4, 1946.—Described R.H.S. JOURNAL **70**, 36. (**H.C.** 1944.)

Sabine (raised and sent by Messrs. J. G. Ballego & Sons, Leiden, Holland). **A.M.** August 22, 1946.—4½ feet. Flowers 4½ inches diameter, Carmine Rose (H.C.C. 621), heavily overlaid golden-orange, very free and erect, on 6- to 14-inch stalks, above the foliage.

Beryl (raised and sent by Messrs. Stredwick & Son, Silverhill Park, St. Leonards-on-Sea). **H.C.** September 4, 1946.—4½ feet. Flowers 4½ inches diameter, Fuchsine Pink (H.C.C. 627, at tips of florets (H.C.C. 627/1), free and erect, on 8- to 12-inch stalks, above the foliage.

Fairholme (raised and sent by Mr. J. F. Barwise, Towneley Nursery, Burnley, Lancs). **H.C.** September 4, 1946.—3¾ feet. Flowers 3½ inches diameter, Fire Red (H.C.C. 15), shaded carmine at tips and reverse of the florets, free and erect, on 5- to 10-inch stalks, well above the foliage.

Mab (raised and sent by Messrs. J. Stredwick & Son, Silverhill Park, St. Leonards-on-Sea). **H.C.** September 4, 1946.—3½ feet. Flowers 4 inches diameter, Phlox Pink (H.C.C. between 625 and 625/1), tips of florets and reverse creamy-white, free and erect, on 7- to 10-inch stalks, above the foliage.

The following varieties have been retained for future judgment: ANIMATO (Bruidegom), ARABESKE (Bruidegom), DOROTHEA'S SUCCESS (Derudder and TORBAERT), DAINTY ROSE (Carter Page), MARY TATTAM (Barnes).

The following varieties have been deleted from the trial: CHERIE, GRATIOLA, ROSARY.

CACTUS

Leiden's Sulphur (raised and sent by Messrs. J. G. Ballego & Sons, Leiden, Holland). **H.C.** September 4, 1946.—4 feet. Flowers

6-inches diameter, Primrose Yellow (H.C.C. 601/2); free and erect, on 10- to 14-inch stalks, well above the foliage.

The following varieties have been retained for future judgment; Fijnstraal (Bruidegom), Victory Day (Bruidegom).

SPRING SOWN ONIONS AT WISLEY, 1946

Eighteen stocks of Onions, grown from Home produced seed, were sent to Wisley for trial. These were sown, under glass on March 1, 1946, pricked off into boxes, on March 29, 1946, and planted out, on May 15 in rows 15 inches apart, 8 inches separating the plants in the rows. All made good growth and on the whole, most of the stocks were true and regular.

Good commercial stocks of the following were grown for comparison: ' Reading Improved,' ' Bedfordshire Champion ' and ' Wroxton.'

The trial was inspected by a Sub-Committee of the Fruit and Vegetable Committee, which made their final decisions and recommendations for Awards on October 9, 1946, as given below.

Yellow Varieties

Bulbs Flat-round

Rousham Park Hero, Watkins & Simpson's Selection (raised, introduced and sent by Messrs. Watkins & Simpson, Ltd., 27, Drury Lane, Covent Garden, London, W.C. 2). **A.M.** October 9, 1946.—Plants vigorous; bulbs 4¼ inches diameter, 3 inches deep, flat-round, average weight 14 oz., very solid; outer skin greenish-straw, inner white. A very good even stock with deeper bulbs than the original strain. (**A.M.** 1923.)

Giant Zittau, Watkins & Simpson's Selection (raised, and sent by Messrs. Watkins & Simpson, Ltd., 27, Drury Lane, Covent Garden, London, W.C. 2). **A.M.** October 9, 1946.—Plants vigorous; bulbs 3¾ inches diameter, 3 inches deep, flat round, average weight 12 oz., very solid; outer skin golden-brown, inner white. A very good even stock with deeper bulbs than the original strain. (**A.M.** 1940.)

Giant Zittau (sent by Messrs. A. L. Tozer, Ltd., Pyports, Church St., Cobham, Surrey). **A.M.** October 9, 1946.—Characters of the last, but bulbs slightly smaller and of a darker colour. A very good even stock.

The following varieties were grown and belong here;— A.1. Select (Cullen), Bunting's Exhibition (Bunting), Market Favourite (Bunting), Walker's Exhibition Improved (Nutting), Brown Globe (Waller).

Bulbs Round

Best of All (raised by Mr. W. Peters, introduced and sent by Messrs. Watkins & Simpson, Ltd., 27, Drury Lane, Covent Garden, London, W.C. 2). **A.M.** October 9, 1946.—Plants vigorous; bulbs 3½ inches diameter, 3¼ inches deep, deep round, average weight 12 oz., very solid; outer skin golden-brown, inner white. A very good even stock.

Golden Ball (raised, introduced and sent by Messrs. Nutting & Sons, Ltd., Merstham, Surrey). **A.M.** October 9, 1946.—Plants vigorous; bulbs 3 inches diameter, 2¾ inches deep, round, average weight 7 oz., solid; outer skin pale greenish-straw, inner white. A very good even stock (**H.C.** 1940).

The following varieties were grown and belong here:— CRANSTON'S EXCELSIOR IMPROVED (Nutting), UP-TO-DATE (Bunting), UP-TO-DATE, RESELECTED (Yates & Sons, Evesham).

Bulbs Oval-shaped

Ailsa Craig, Watkins & Simpson's Selected (raised by Mr. Deverill, selected, introduced and sent by Messrs. Watkins & Simpson, Ltd., 27, Drury Lane, Covent Garden, London, W.C. 2). **A.M.** October 9, 1946.—Plants vigorous; bulbs 3⅜ inches diameter, 3 inches deep, oval to round shaped, average weight 12 oz., solid; outer skin, light brownish-straw, inner white. A good even stock, being of the true original type, which keeps well.

The following varieties were grown and belong here: AILSA CRAIG SELECT (Nutting), NEW OVAL (Clucas), PRIZEWINNER (Yates & Sons, Evesham).

RED VARIETY

Bulbs Oval-shaped

Victory (raised, introduced and sent by Mr. John C. Curtis, Kathleven, Highbridge Road, Burnham-on-Sea). **H.C.** October 9, 1946.—Plants vigorous; bulbs 3 inches diameter, 3¼ inches deep, round to globe shaped, average weight 10 oz., very solid; outer skin reddish-brown, inner white. Keeps well.

PLANTS TO WHICH AWARDS HAVE BEEN MADE IN 1946

Angraecum infundibulare, St. Albans var. **A.M.** December 3, 1946. This African species bears large funnel-shaped flowers, which are white with a greenish spur, and generally sweetly scented. Exhibited by Messrs. Sanders, St. Albans. (See p. xxxi.)

Brassolaeliocattleya 'Crusader, var. 'Radiant.' **F.C.C.** December 3, 1946. The spike bore three large and well-developed flowers, of a pleasing pinkish-mauve colour, the expansive labellum displaying this colour more intensely, while the central area is orange-yellow. The result of crossing *Blc.* 'Queen Elizabeth' with *Lc.* 'Trivanhoe.' Raised and exhibited by H. W. B. Schroder, Esq., Dell Park, Englefield Green, Surrey. (See p. xxxi.)

Cypripedium 'Bahram,' Orchidhurst var. **A.M.** December 3, 1946. An attractive flower of light greenish-yellow colour, except for the upper part of the dorsal sepal, which is white. Raised and exhibited by Messrs. Armstrong & Brown, Tunbridge Wells, the parents being *C.* 'Grace Darling' and *C.* 'Anita.' (See p. xxxi.)

Cypripedium 'Banchory.' **A.M.** December 3, 1946. This elegant flower has a dorsal sepal of apple-green colour, while the petals and labellum are ochre-yellow tinged with brown. The result of crossing *C.* 'Grace Darling' with *C.* 'Dickler.' Exhibited by Mr. S. Farnes, East Grinstead. (See p. xxxi.)

Chrysanthemum 'Amber Vale.' **A.M.** September 17, 1946. As an early-flowering exhibition variety. Flower stems strong, 20 inches long. Flowers double, 5½ inches diameter, golden-yellow; outer florets reflexed, inner incurved. Raised and exhibited by Messrs. J. & T. Johnson, Tibshelf, Derbyshire. (See p. xxvii.)

Chrysanthemum 'Betty Riley.' **A.M.** September 17, 1946. As an early-flowering variety for exhibition. Flowering stems stout, 17 inches long. Flowers double, 5½ inches diameter, outer florets reflexed, inner incurved, flat, pale rose-pink, tips of reverse gold. Raised and exhibited by Mr. E. Riley, Brookside Nurseries, Alfreton, Derbyshire. (See p. xxvii.)

Chrysanthemum 'Bulwark.' **A.M.** September 17, 1946. As an early-flowering variety for exhibition. Flower stems stout, 22 inches long. Flowers double, 5¾ inches diameter, outer florets reflexed, inner incurved, deep reddish-bronze, reverse of florets gold. Raised and exhibited by Messrs. J. & T. Johnson, Tibshelf, Derbyshire. (See p. xxvii.)

Chrysanthemum 'Cream Duchess.' **A.M.** September 17, 1946. As an early-flowering variety for exhibition. Flower stems strong, 20 inches long. Flowers double, 5½ inches diameter, florets incurved, creamy-white. A sport from 'Duchess.' Raised and exhibited by Messrs. Johnson (Florists) Ltd., Forge Nurseries, Burton-on-Trent. (See p. xxvii.)

Chrysanthemum 'Yellow Corona.' **A.M.** September 17, 1946. As an early-flowering variety for exhibition. A bright lemon yellow sport from 'Corona.' Shown by Messrs. J. & T. Johnson, Tibshelf, Derbyshire. (See p. xxvii.)

Helianthus orgyalis. **A.M.** October 8, 1946. An uncommon and distinct species of Sunflower. The erect, unbranched stems are eight to ten feet high, densely clothed with narrow-lanceolate drooping leaves up to a foot long. The numerous small, lemon-yellow flowers are borne in narrow, terminal panicles. Exhibited by the Director, Royal Botanic Gardens, Kew. (See p. v.)

Laeliocattleya × 'Derrynane' var. 'Comet.' **A.M.** October 8, 1946. The spike bore two large flowers, rose colour, with purplish flushing on the petals, the expansive labellum ruby-crimson. The result of crossing *Lc.* 'Balkis' with *Lc.* 'Princess Margaret.' Exhibited by Major the Hon. H. R. Broughton, Bakeham House, Englefield Green, Surrey. (See p. vi.)

Laeliocattleya × 'Eastern Queen.' **A.M.** August 13, 1946. The spike bore two large and well-formed flowers of rosy mauve colour, the labellum crimson-purple and frilled at the margin. The result of crossing *Lc.* 'Trivanhoe' with *C.* 'Prince Shidamzu.' Raised and exhibited by H. W. B. Schroder, Esq., Dell Park, Engelfield Green. (See p. lxxi, vol. LXXI).

Laeliocattleya × 'Fiesta.' A.M. September 24, 1946. The spike bore two flowers of medium size, the sepals and petals citron-yellow, the labellum ruby crimson. The parents were *Lc.* 'Canberra' and *C. Dowiana.* Exhibited by Mr. Clint McDade. (See p. iii.)

Laeliocattleya × 'Golden Ray.' A.M. July 30, 1946. The flower is of medium size and thick textured. In colour golden-orange, the labellum a deeper tint with scarlet-red markings. The result of crossing *C. fulvescens* with *Lc.* 'Golden Gleam.' Raised and exhibited by Messrs. H. G. Alexander, Ltd., Tetbury, Glos. (See p. lxviii, vol. LXXI.)

Laeliocattleya 'Michael,' Westonbirt var. F.C.C. December 3, 1946. The spike bore a couple of well-formed flowers, the sepals and up-standing petals pure white, the expansive labellum bright purple with a narrow white margin. The result of crossing *C. labiata* var. *Gilmouriae* with *Lc. Schroederae alba.* Raised and exhibited by Messrs. H. G. Alexander, Ltd., Tetbury. (See p. xxxi.)

Laeliocattleya × 'Oriental Prince,' var. 'Eastern Queen,' this is the correct name of the plant which received an Award of Merit on August 13, 1946. (See p. lxxi, vol. LXXI.)

Lilium 'Kulshan.' A.M. July 16, 1946. This is one of the hybrids raised at the Bellingham Bulb Station in North Washington from a cross between *L. Humboldtii* and *L. pardalinum.* The stem reaches a height of 5 or 6 feet, bearing whorled lanceolate leaves 4 inches long and a pyramidal inflorescence of two dozen flowers. The pedicels are 5 inches long, ascending, the flowers pendulous with closely reflexed perianth segments about 3 inches long, orange (H.C.C. 9) spotted all over with maroon. Exhibited by W. Bentley, Esq., Quarry Wood, Burghclere, Newbury. (See p. lxiv, vol. LXXI.)

Miltonia × 'Rubicon.' A.M. June 18, 1946. The plant bore nine well-formed flowers of crimson colour. The result of crossing *M.* 'J. B. Crum' with *M. pulchra.* Exhibited by Mr. S. Farnes, East Grinstead. (See p. lix, vol. LXXI.)

Odontioda × 'Eudacis.' A.M. November 5, 1946. This pleasing hybrid between *Odontioda* 'Acis' and *Odontoglossum* 'Eudora' bore a spike of thirteen well-formed flowers, of light rose ground colour, heavily blotched and spotted with scarlet-red. Raised and exhibited by H. S. Wharton, Esq., Shalston, Templewood Avenue, Hampstead. (See p. xxix.)

Oncidium Lanceanum, St. Albans var. A.M. October 22, 1946. This species was first introduced from Surinam in 1834 by Mr. J. H. Lance. The present example bore flowers of thick texture, buff. yellow spotted with chocolate-brown, the labellum rose-purple. Exhibited by Messrs. Sanders, St. Albans. (See p. viii.)

Phalaenopsis × 'Katherine Siegwart' var. 'Etna.' A.M. July 30, 1946. The branched spike bore a total of 16 white flowers, which are well-formed and of large size. The result of crossing *P. amabilis* with *P.* 'Gilles Gratiot.' Exhibited by A. F. Knight, Esq., 34 Hova Villas, Hove. (See p. lxviii, vol. LXXI.)

Potinara × 'Medea.' A.M. November 5, 1946. This is a quadrigeneric hybrid obtained by crossing *Sophrolaeliocattleya* 'Cleopatra' with *Brassolaeliocattleya* 'Beatrice.' The spike bore a couple of flowers in which the segments are of model formation, of a pleasing rosy mauve colour, the labellum having a rich crimson frontal lobe and a yellow area in the throat portion. Raised and exhibited by Messrs. H. G. Alexander, Ltd., Tetbury, Glos. (See p, xxix.)

Rhododendron 'Polar Bear.' F.C.C. September 10, 1946. One of the latest of its race to flower, normally during August in the south of England, this handsome hybrid was raised by Mr. J. B. Stevenson in 1933 by crossing *R. diaprepes* with *R. auriculatum.* The leaves on the stems exhibited were 9 inches long, 3 inches wide, slightly auriculate at the base, glaucous beneath with prominent veins. From eight to ten of the 4-inch wide, pure white, fragrant flowers with a narrow green throat are borne on downy pedicels in each inflorescence ; the stamens, shorter than the curving style with prominent capitate stigma, vary in number from thirteen to sixteen. Exhibited by Sir Henry Price, Wakehurst Place, Ardingly, Sussex. (See p. lxxiv, vol. LXXI.)

Roscoea procera. A.M. July 2, 1946. A hardy, herbaceous, Himalayan plant with a stout, erect stem up to 3 feet in height, bearing ovate-lanceolate leaves about 8 inches long. The flowers are borne in a terminal cluster of three or four. The narrow upper segments are white and form a hood over the large white, purple-stained labellum. The species is figured in the *Botanical Register* of 1840 (Vol. 26, t. 61) as *R. purpurea.* Exhibited by Col. F. C. Stern, O.B.E., M.C., Highdown, Goring-by-Sea. See p. lxii, vol. LXXI.)

Rose 'Arthur J. Taylor.' A.M. October 8, 1946. A fully double, deep rose-pink H.T. variety of vigorous habit. Raised and exhibited by Messrs. Wheatcroft Bros., Ltd., Ruddington, Nottingham. (See p. v.)

Rose 'Canarybird.' A.M. May 1, 1945.* An extremely attractive, early-flowering Rose believed to be a form of *R. xanthina.* The fragrant single flowers, of bright Canary Yellow (H.C.C.2–2/1) are 2½ inches across and are produced in large numbers on the graceful arching stems. The leaves are composed of from nine to thirteen oval or oblong, obtuse, serrate leaflets, villous beneath while young. Exhibited by Messrs. L. R. Russell, Ltd., Windlesham. (See p. xxxvii. vol. LXX.)

Rose 'Ena Harkness.' A.M. July 2, 1946. A beautifully formed, rich crimson-scarlet Hybrid Tea Rose which resulted from a cross between 'Crimson Glory' and 'Southport.' The flowers are scented and the colour is said not to fade but to last until the petals drop. The plant appears to be vigorous and very free flowering in habit. Raised by Mr. A. Norman and shown by Messrs. R. Harkness & Co., The Rose Gardens, Hitchin, Herts. (See p. lxi, vol. LXXI.)

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* The publication of this award was delayed for naming.

BOOK NOTES

"Goethe's Botany." By Dr. Agnes Arber, F.R.S., from the *Chronica Botanica* Vol. 10, No. 2, 1946. (*Chronica Botanica*, Waltham, Mass., U.S.A., and Wm. Dawson, London). 2 dollars.

Those who are unaware of the manysidedness of the genius of the poet Goethe may be surprised that his scientific work attracted and still attracts the attention of biologists. Dr. Agnes Arber, one of the foremost of botanical morphologists, has rendered a great service to botanists by giving us a critical account of the development of morphological ideas in Goethe's mind and by supplying a revised translation of his "Attempt to interpret the Metamorphosis of Plants," which was first published in 1790. Two French translations of this essay by pupils of de Candolle appeared in 1829 and 1831 respectively, but it was not until 1863 that a version was published in English by Emily Cox with explanatory notes by Maxwell T Masters. This appeared in the *Journal of Botany* (Vol. 1). Dr. Arber's translation was made independently but carefully compared with the *Journal of Botany* version Occasionally she has given a freer translation and in one case (§ 51) she corrects what was evidently a mistake in the original German text. Goethe's essay deals not with the whole plant but with the metamorphosis of the leaves, showing their change of shape and function from the lowermost vegetative leaves of the stem to the more modified and specialised leaves of the flower. This view of the fundamental unity of foliar structures is now generally accepted, but even before Goethe's time the transformation of leaves had been put forward by Nehemiah Grew and Malpighi in the seventeenth century and, twenty years before Goethe published his essay, C. F. Wolff made a remarkably complete, but brief, statement of views closely related to those of the poet. But as Dr. Arber points out, Goethe had not a complete knowledge of botanical literature and may not have known of these anticipations of his ideas. He certainly based his conclusions on his own observations and is entitled to full credit for any views which he had himself evolved without any conscious borrowing. As Dr. Arber rightly says, "These ideas Goethe alone succeeded in developing into a unified organic whole by adjusting them to the living framework of his thought and thus creating one of the minor classics of botany."

The first and second editions of the "Metamorphosis," both published in 1790, had no illustrations, as the drawings made by and for Goethe for the purpose seem to have disappeared during his lifetime. One set, in a small portfolio dated 1795, was published by Hansen in 1907 and a further set was published by Schuster in 1924. They indicate the thorough manner in which the poet prepared the evidence for his theory of the transformation of the leaves from nutritive to reproductive organs.

After dealing with Goethe's "Metamorphosis of Plants," Dr. Arber gives us the German and the English text of the Aphoristic Fragment known as "Nature," which was translated into English by T. H Huxley and formed the introduction to the first volume of the British Journal *Nature*. It was supposed by some to be composed by Goethe's contemporary and friend Tobler, but towards the end of his life Goethe seems to have believed that these aphorisms were written by himself and they were included in his published works. Dr. Arber, in her preparatory note, gives much interesting information concerning the authorship of these poetical aphorisms. Indeed, we should be grateful for the skill and patience with which she has dealt with both of Goethe's publications. Apart from the excellence of her careful translations, the biographical notes she gives and her authoritative criticism render her publication so important that all who are interested in Goethe's botanical work will be bound to consult it.

F. E. W.

"Norfolk Notebook." By Lilias Rider Haggard. 8vo. 177 pp. (Faber and Faber, London.) 8*s*. 6*d*.

This Diary, begun in June 1938 and continued to Christmas 1939, is not an instruction in horticulture nor a book in praise of gardens. Indeed, there is not much directly concerning the garden in it. Nevertheless it is a book which every garden lover who also delights in the English countryside will read with unbounded pleasure. It is full from beginning to end of the joy of one who loves the English land, who goes about with open eyes, and writes of what she sees in simple, unforced words which bring that joy to the minds and hearts of her readers. Inconsequent sometimes as though a sudden thought or sight had deflected the line she set out to follow, but pleasant always, and drawn from a mind stored with ancient lore yet open to the impressions and significance of the moment, it is a book to read and to treasure.

F. J. C.

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JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

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April 1947

THE SECRETARY'S PAGE

Programme of Meetings.—The following Meetings and Shows will take place during April and May:

Tuesday, April 1—12 noon to 6 P.M.
Wednesday, April 2—10 A.M. to 5 P.M.
Tuesday, April 15—12.30 P.M. to 6 P.M.
Wednesday, April 16—10 A.M. to 5 P.M.
Tuesday, April 29—12.30 P.M. to 6 P.M.
Wednesday, April 30—10 A.M. to 5 P.M.

CHELSEA SHOW

Wednesday, May 21	
8 A.M. to 1 P.M.	Show open only to Fellows and Associates.
1 P.M. to 8 P.M.	Admission 10*s.*
Thursday, May 22	
8 A.M. to noon	Show open only to Fellows and Associates.
Noon to 5 P.M.	Admission 5*s.*
5 P.M. to 8 P.M.	Admission 2*s.* 6*d.*
Friday, May 23	
8 A.M. to 5 P.M.	Admission 2*s.* 6*d.*

Daffodil Competition and Show.—At the Show on April 1 and 2 there will be a Daffodil Competition intended primarily for, but not restricted to, West Country growers. The annual Daffodil Show will be held in conjunction with the Fortnightly Show on April 15 and 16. Schedules may be obtained on application to the Secretary.

Show and Demonstration of Mechanical Appliances.—In conjunction with the Show on April 1 and 2 there will be an exhibition of mechanical appliances suitable for horticultural purposes in the Old Hall in Vincent Square. A fortnight later, on Wednesday and Thursday, April 16 and 17, many of these mechanical appliances will be demonstrated at the Society's Gardens at Wisley. It is hoped that this exhibition and demonstration will give Fellows and others an opportunity to see the latest developments in labour-saving devices for private gardens and other horticultural establishments.

Early Market Produce Show.—This Show, which was mentioned in the Secretary's Page last month, has, unfortunately, had to be cancelled. The recent very severe spell of bad weather has rendered it improbable that growers could provide adequate displays. The National Farmers' Union is arranging to stage a co-operative exhibit of vegetables and fruit, and another of flowers, at the Chelsea Show.

Rhododendron Competition.—The Annual Rhododendron Competition will also be held in conjunction with the last Fortnightly Show in April. The schedule, containing numerous classes open to amateurs, may be obtained from the Secretary.

Sewell Medal Competitions for Alpines.—Medals for exhibits of Alpines are offered for award at the first and last Fortnightly Shows in April. Particulars are given in schedules which may be obtained from the Secretary.

Auricula and Primula Competition.—In conjunction with our Society's Fortnightly Show on April 29 and 30 the National Auricula and Primula Society will hold a competition. For full particulars application should be made to Mr. E. J. DORE, Hon. Secretary of the National Auricula and Primula Society, The Cottage, Riseley, Reading.

Kindred Societies' Shows.—Fellows' and Associates' tickets will admit to the Alpine Garden Society's Show, which is to be held in the Old Hall on Tuesday and Wednesday, April 22 and 23. On the same dates there will be a Show in the New Hall organized by the British Carnation Society, to which Fellows' and Associates' tickets will also admit.

Lectures in April.—There will be no lecture in conjunction with the Show on April 1 and 2. The Institute of Landscape Architects is organizing a Brains Trust on "The Post-War Garden" on Tuesday, April 15, at 3 P.M. in the Lecture Room of the New Hall. Mr. G. A. JELLICOE, President of the Institute of Landscape Architects, will take the Chair. On Tuesday, April 29, Mr. C. A. CAMERON BROWN will be lecturing on "The Use of Electricity in Horticulture," at 3 P.M. in the Lecture Room.

Garden Advisory Service.—Owing to a large number of Fellows making applications for the services of the Society's Garden Adviser late in 1946, it was, unfortunately, impossible to deal with all requests. Any Fellow who requires this service this year is advised to make an early application, stating the time of year he would like a visit from the Garden Adviser. The receipt of early applications will enable us to spread the work of the Garden Adviser throughout the year and, we hope, to avoid disappointing Fellows. If a Fellow intends to re-arrange his garden with consequent re-planting, the spring or summer is the most convenient period for a survey to be made. Time will then be available for the necessary work on the garden to be put in hand before winter. There is a further advantage that it will be possible to place orders with nurserymen at an early date for new stock, which may be in short supply.

Application for advice should be made to The Secretary, The Royal Horticultural Society, Vincent Square, London, S.W.1.

Sixth International Congress for Experimental Cytology.—The Sixth International Congress for Experimental Cytology will meet in Stockholm on July 10 to 17, inclusive, this summer. We have been asked by the General Secretary of the Congress to extend a cordial invitation to any members of our Society who might care to go. Preliminary programmes and forms of application for membership are available, and may be obtained from this office.

The Society's Examinations.—The written examination for the National Diploma in Horticulture (Preliminary and Final) will take place on Saturday, April 12.

Publications.—" The Newer Gentians." This pamphlet has been revised and amended by Mr. C. T. MUSGRAVE, V.M.H., and an appendix on the newer hybrids together with a note on cultivation has been added by Mr. G. H. BERRY. The price is now 1*s*. 6*d*. post free.

" Fruit Spraying Calendar." This has now been published as a large varnished card suitable for hanging up in the potting shed, price 1*s*., post free.

WISLEY IN APRIL

VISITORS to the Gardens this month will find a rapidly increasing display, particularly amongst the collections of hardy shrubs and on the Rock Garden. The extremely severe weather of the past winter has badly damaged a number of the more tender shrubs, particularly those planted round the Laboratory, and the time of flowering of many plants has been delayed. Several subjects noted last month are still in full flower, owing to the delay in starting into vegetative growth. For many days in February the temperature never rose above freezing point, and damage from these conditions is now apparent in the death of many exposed flower buds.

The main Shrub collections of proved hardiness will add greatly to this month's display, and the majority of the plants in flower, especially towards the end of the month, will be found in the open, rather than in the glasshouses as in the earlier months of the year.

The Rhododendrons in flower on Battleston Hill will increase in number week by week, and, joining those mentioned last month, will be seen *R. planetum*, a handsome erect plant with large trusses of clear rose pink flowers, *R. Stewartianum*, of neat habit, with pink or creamy white waxen bells, the better known *R. racemosum* with blush to bright pink flowers, and the lilac or mauve flowers of *R. rubiginosum*. Over fifty species have been counted in flower during April, and towards the end of the month the first of the large collection of Rhododendron hybrids will be opening their flowers to herald a display which will reach its zenith in late May.

Over the bridge on the hill will be found many other Rhododendrons together with varieties of *Camellia japonica, Magnolia stellata, M. Soulangeana* and the distinct white-flowered *Camellia cuspidata.*

Planted amongst the collection of Rhododendron hybrids are several Acers of considerable merit; many of these combine coloured bark with great beauty of foliage and flowers in the early spring.

Near the base of the hill is planted the collection of Daffodils which have received the Award of Merit; these should begin to bloom towards the end of the month.

Passing to the Alpine House through the Rose Walk visitors will notice several of the flowering Cherries in full bloom, including the free flowering *Prunus yedoensis* and the delightful pink *P. Sargentii,* closely followed in bloom by the many varieties of the popular hybrid Japanese Cherries, including 'Kanzan,' an erect growing shrub with deep rose pink blooms, 'Oku-miyako' with long stalked white flowers and the bronze tinted leaves and sulphur yellow flowers of 'Ukon.'

The Alpine House will be very well stocked this month. Many of the small Saxifrages noted last month will continue in flower, their opening delayed by the severe weather. New arrivals will be Primulas and Lewisias, particularly *Primula Clarkei,* a dainty species with pale pink flowers, *Lewisia pygmaea* and *L. brachycalyx* of the dwarf section, with *L. Tweedyi* and *L. Heckneri* of the taller more brightly coloured kinds.

Tulip species will also add to the display, and the neat, well-flowered pans of some of the smaller Ericaceous shrubs will repay inspection. Outstanding amongst these are the charming white flowers of *Cassiope tetragona* and *C. lycopodioides.*

The Rock Garden is slowly awakening to life after a winter which must have seemed, to many of its members, very like their native habitat, as, owing to the general northerly slope, the snow lay longer here than in most other parts of the garden. A good specimen of *Prunus subhirtella* var. *pendula* surrounded with *Rhododendron racemosum* will make a pleasing picture in various shades of pink, while the Alpine Meadow will be well clothed with colonies of *Narcissus Bulbocodium. Primula Juliae* and *P. rosea* will be flowering by the pond side, and here also will be found the yellow spathes of *Lysichiton americanum* and the more graceful white of *L. camtschatcense,* with the long-stalked rosy heads of *Saxifraga peltata,* valued for its later appearing large and ornamental foliage.

Many saxatile plants will now be in flower and mention can only be made of a few. *Gentiana pumila* and *G. acaulis* are rivalled by the rich blue of *Omphalodes nitida,* while near at hand the Prophet Flower *Macrotomia echioides* opens its yellow flowers, marked with maroon blotches which fade as the flowers age.

The Wild Garden contains many large specimens of Rhododendrons, Camellias, and Amelanchiers, and these together with the shrubs mentioned last month, will make a delightful display above the plantings of bulbs and other carpeting plants, which provide many flowers this month. Particularly outstanding are the coloured forms of *Anemone nemorosa* and *A. apennina*, the various shades of pink of *Shortia galacifolia*, and the larger *S. uniflora* var. *grandiflora*, with the related *Schizocodon soldanelloides* and *S. macrophyllus* having fringed flowers and glossy evergreen leaves.

The Award of Garden Merit Collection contains particularly fine specimens of *Magnolia Soulangeana* and *Erica arborea alpina*, both of which will be in full flower later this month.

The Heath Garden will continue to provide fresh flowering subjects, though it is feared that the severe weather may result in some unsightly gaps. *Erica mediterranea* and *E. arborea* are two of the taller-growing Heaths in flower this month, soon followed by *Erica australis*, the 'Spanish Heath,' and its well-known white variety 'Mr. Robert.'

The latter part of the month should see many of the shrubs in Seven Acres coming into flower; Berberis in great variety, Spiraeas, Pyrus, and many of the flowering Cherries, will join the several kinds of Forsythias already in bloom.

Passing through the Pinetum to Howard's Field, we shall find the first Lilacs in flower, and a few of the earlier Rose species particularly *Rosa Hugonis* and *R. Primula*, both graceful plants with yellow flowers.

The various coloured Japanese Quinces will also be flowering, and a few of the smaller Prunus, including the Russian Almond *P. nana* and the double white *P. glandulosa* with its pink variety *sinensis*.

Visitors to the Gardens in April will note that the 16th and 17th have been reserved for a large demonstration of mechanical garden implements covering all the horticultural operations which can be assisted by mechanical means. This exhibition has been arranged to assist all those wishing to make increasing use of the many labour-saving mechanical appliances now available for the garden. Machines will be demonstrated, which are of use to both the commercial horticulturist and the private gardener, over a wide range of gardening activities. The large field between the Portsmouth Road and Battleston Hill will be used for row-crop work of all kinds, while ploughing and drilling will be in progress in an adjoining field. In addition, sprayers, lawn mowers, motor scythes, and irrigation equipment, together with many other mechanical aids, will be on view throughout the Gardens.

PLANT COLLECTING IN SOUTH-EASTERN TIBET

By George Taylor, D.Sc.

PART I

IN 1938 I was invited by my friends, FRANK LUDLOW and GEORGE SHERRIFF, to accompany them to S.E. Tibet, and it has been suggested that my field observations, especially on *Meconopsis*, might be of some interest to horticulturists. It may not be out of place to mention that the magnificent collections made by LUDLOW and SHERRIFF on their many expeditions are preserved in the British Museum (Natural History) where they may be consulted on application to the Keeper of Botany. The specimens are fully documented with descriptions of the plants and particulars of the natural habitat. All plants which have been introduced to gardens by LUDLOW and SHERRIFF are represented. Horticulturists may, therefore, appreciate access to these details as an aid to cultivation.

The expedition of 1938 was one of a series, planned by LUDLOW and SHERRIFF, to carry biological investigation from the western frontier of Bhutan to the gorge of the Tsangpo. In 1936 my companions had travelled through the Tibetan districts of Chayul, Charme and Tsari and had paid hurried visits into the Tsangpo Valley: in 1938 the eastward exploration was continued through the provinces of Takpo and Kongbo and along the main Himalaya to the neighbourhood of Namcha Barwa. This noble mountain (25,445 feet) and the more massive but less impressive Gyala Peri (23,460 feet) form the portals of the gorge which the mighty Tsangpo cuts through the Himalaya, falling 6,000 feet in 150 miles, to emerge as the Dihang from the foothills of Assam. From the Lo La, the most easterly pass reached in 1936, to Namcha Barwa the main range gradually converges to the Tsangpo over a distance of some ninety miles and on this stretch it was proposed to concentrate our main collecting effort.

The Himalaya is a formidable barrier to the moisture-laden clouds of the S.W. monsoon and comparatively little rain penetrates beyond the main range. North of Sikkim and Bhutan the change from a wet to a dry zone is very abrupt; within three or four miles one passes from lush vegetation to the aridity of the Tibetan plateau. A heavier monsoon assails the eastern end of the Himalaya which is traversed by several low passes and where the average height of the range is less than further west. In this region, too, terrific gorges breach the main range where rivers from Tibet have pierced their way through. Here, then, the range is not such an effective barrier to rain and the monsoon clouds penetrate the gorges and sweep over the lower mountains, so that the northern slopes, receiving an annual and prolonged drenching, support an extremely rich flora with a high representation of plants of garden merit.

In order to reach our collecting area we decided to cross the plateau by the Lhasa road from Sikkim (Fig. 58) to the point where it crosses the Tsangpo and then to follow the river down. The route to Gyantse has been fully described by many travellers and there is a good account of the country from Gyantse to Tsela Dzong in KINGDON-WARD'S *The Riddle of the Tsangpo Gorges* which also deals charmingly with the vegetation of much of the area which we visited.

By splitting into parties we were able to visit over a dozen passes at the height of the flowering season, few of them shown on existing maps and only one (Doshong La) previously explored. When the parties reunited it was obvious that some interesting comparisons could be made. It was found that many passes, in the alpine zone particularly, held distinctive plants, and this was very marked in the genus *Primula*. For instance, the alpine slopes of the Lusha La were ablaze with the rich purple flowers of *P. calliantha*, while on the Tamnyen La, barely five miles away, there was no sign of this species which was only previously known from far-off Yunnan. An even more striking contrast was afforded by the Doshong La and the Pero La. On the Doshong La, so vividly described in KINGDON-WARD'S writings, huge drifts of *P. falcifolia*, *P. chionota* and *P. Valentiniana* (See *Quart. Bull. Alp. Gard. Soc.* vii, 228 (1939)) covered the moorland, but these species were all absent from the Pero La barely three miles away. Climatic and edaphic conditions on the passes seemed to be identical and it is not easy to interpret such erratic local occurrences of plants, which were by no means confined to *Primula*.

The phyto-geography of the area which we explored is intensely interesting and our collections should help in its further elucidation. It is axiomatic that mountain ranges such as the Himalaya have acted as highways for the dispersal of plants, and where we were it was possible to recognize floral elements, some of which clearly had migrated from the west and some from the east. Several species of British plants flourished in company with some characteristic of Szechuan and Yunnan which here, apparently, reach the westerly limit of their range.

I left Gangtok in Sikkim for the Chumbi Valley in early April 1938 and for the first few days delighted in the profuse vernal flora of the southern Himalayan slopes. Above the subtropical zone, the scarlet trusses of *Rhododendron arboreum*, mingling with the white chalices of *Magnolia Campbellii* in the canopy of the forest, made an unforgettable picture. This was only one of many thrills which enriched my introduction to the Himalayan flora. Many plants which I had previously known only from dried museum specimens were revealed in their true beauty.

On the second day's march (April 9), I saw the first Himalayan Poppy. I had left the track to examine fine clumps of *Primula gracilipes* and *P. Listeri*, whose rich magenta flowers carpeted the peaty loam on a shady bank amongst dwarf Rhododendrons, when I noticed amongst the adjoining scrub the expanding leaves of a species of *Meconopsis*. The withered remnants of fruiting inflorescences with narrow tattered capsules, which had survived the rigours of winter, proclaimed the plant to be *M. villosa*. The tight tufted rosette was much enhanced in appearance by the dense covering of golden brown bristles. This species deserves to be more widely grown and, judging from the natural habitat, should be specially at home amongst dwarf Rhododendrons and other small shrubs.

On the following day (April 10) I left Changu bungalow to cross the Tibetan frontier at the Nathu La. It had snowed overnight and the small Rhododendrons peeping through the snow blanket looked very forlorn with drooping leaves. At about 12,000 feet, in open spaces on the hillside, where scraggy specimens of *Abies Webbiana* were dotted about, I saw the tall fruiting inflorescence of a Poppy protruding from the snow. By scraping away the snow near to the dead specimens, the handsome winter rosettes of *Meconopsis paniculata* were revealed. These plants must endure great extremes of temperature and possibly take some years to reach maturity.

Once one is across the Nathu La into the Chumbi Valley, the luxuriant Himalayan vegetation is soon left behind though there is much to interest the botanist and horticulturist in the river-valleys and even on the plateau of Tibet. I had to traverse the plateau and travel far down the Tsangpo Valley before I saw further species of *Meconopsis*. It was an eventful day—May 16. I was on the last lap of my solitary journey to meet LUDLOW and SHERRIFF at Molo and my route, deviating from the Tsangpo, led up to the Palang Chu to the Lang La. On the higher grazing grounds, copiously mulched with yak droppings, enormous clumps of *Primula Roylei* (see *Quart. Bull. Alp. Gard. Soc.* viii, 112 (1940)) were growing to perfection. It is a pity that this fine plant will not accommodate itself to conditions in our garden. The alpine grassland, between 14,000 and 15,000 feet was gay with the bright blue flowers of a charming little annual Gentian, mixed with the deep indigo-purple flowers of *Gueldenstaedtia himalaica*. I had sent the transport ahead so that I could wander on the slopes collecting. Some distance from the top of the valley the track suddenly turned east and made a bee-line up steep slopes to the crest of the mountains. I caught up with the transport about 1,000 feet below the Lang La, which is almost 16,000 feet in height. For some time I had been ploughing waist-deep through drifts of snow and I was not surprised to find some of the mules floundering and making unavailing efforts to scale the steep snow-slopes. Other animals were standing motionless with their heads and backs barely showing above the snow, but after five hours spent in beating out a track, the unwilling beasts were hauled, pushed and whipped to the summit. Over the pass there was practically no snow and the beautiful valley of the Ne Chu lay below us. On its southern (north-facing) flanks it supports immense Fir forests. Shortly after leaving the pass I was delighted to see two species of *Meconopsis*. Scattered on the lichen-covered scree-slopes were fruiting specimens of the racemose form of *M. horridula* which is not an inviting plant to collect on account of its formidable armature of pungent spines. Rosettes of young plants showed the leaves occasionally stained purple at the base of the spines, a form which was once designated *M. rudis*. In some burnt *Rhododendron* scrub there was considerable abundance of *M. simplicifolia*, the dense tufted rosettes of which, beset with golden-brown hairs, were throwing up flowering stems, but the flowers were not yet expanded and inside the buds the crinkled petals were a rich maroon colour.

LUDLOW and SHERRIFF had been six weeks ahead of me, as I was unable to leave this country in time to start with them, and they planned to explore the rich but inhospitable district of Packakshiri, south of the main range, before our meeting at Molo. " Round about the middle of May at Molo " was as good a guess as any for our assignation and this was the arrangement proposed by SHERRIFF in February over the telephone from Calcutta. My friends reached Molo at 2 P.M. on May 17 and, much to their astonishment, I walked into camp at 2.30 ! Our punctuality was indeed exemplary.

We remained a few days in Molo, repacking our stores and preparing for the more intensive collecting which lay ahead. It was decided that LUDLOW and I should proceed down the Lilung Chu to the Tsangpo and follow the river as far as Lusha before tackling the main range. Our eastern limit was to be Namcha Barwa, while SHERRIFF was to work eastwards from Molo to link up with us.

Below Molo the steep slopes of the Lilung Chu were beautifully wooded, Spruce (*Picea likiangensis*) and Larch (*Larix Griffithiana*) being the dominant species in the upper part of the valley.

A pleasant reminder of home was afforded by the colonies of our native Moschatel (*Adoxa Moschatellina*), on mossy banks in the shade of shrubs, bearing a profusion of tiny green globular flower heads. *Podophyllum emodi* grew in some abundance in rich damp humus on the forest floor. Some days previously I had seen it in the open in splendid flower along irrigation channels in the Tsangpo Valley and the young deflexed crimped leaves, blotched with chestnut-brown, provided a perfect foil for the flushed pink petals surrounding the cluster of golden-yellow anthers. In the Lilung Chu the foliage had fully expanded and the plants were passing into fruit.

Amongst rocks by the river occasional plants of *Rhododendron telmateium* were in full flower. This species, which was first found in Yunnan, is not uncommon on the hillsides and lower parts of the side valleys along the Tsangpo. It forms bushes up to five feet in height and has attractive rich magenta flowers.

We camped in a clearing encircled with magnificent specimens of Spruce, which I judged to be at least 150 feet high, with a few flowering trees of *Malus baccata* lending colour to the undergrowth. On the next day's march we passed through much evergreen Oak (*Quercus semecarpifolia*) and a forest of almost pure *Pinus tabuliformis* to the dry valley of the Tsangpo. The white flowers of *Clematis montana* var. *grandiflora* smothered some of the shrubs growing in clearings of the Pine forest. The turf gleamed with the brilliant blue-violet flowers of *Iris decora* with yellow crests on the falls, although an occasional albino was seen. A conspicuous and rather showy plant of these clearings was *Piptanthus napaulensis*. Here, too, was a species of *Berberis* which has recently been described as *B. kongboensis*. The bushes were six feet in height with lax racemes of up to twenty-five greenish-yellow flowers and attractive reddish-brown twigs.

The track down the south bank of the Tsangpo led through several villages, and it was noticeable that irrigation-channels, a feature of the upper Tsangpo Valley, were no longer required to aid cultivation. Trees reached almost to the bank of the river, and the valleys, running south into the mountains, were thickly forested. At places the track meandered through sand-dunes colonized with a profusion of *Sophora Moorcroftiana*, which was often adorned with the fleshy yellow flowers of *Clematis orientalis* (Fig. 54). Growing prostrate on the sand, the attractive *Oxytropis sericopetala* caught the eye with its deep purple flowers and silvery tomentose leaves while on the hill slopes *Rhododendron triflorum* and fine specimens of *R. vellereum* were in full flower. Several species of considerable horticultural value were noted in this part of the Tsangpo Valley. *Paeonia lutea* formed a thicket on a dry gravelly river terrace and its long, spindly, usually unbranched stems up to eight feet in height, bore a few leaves, towards the top and above carried up to four golden-yellow flowers which, with the sun shining through the translucent silky petals, were brilliant. Another noteworthy plant was *Elaeagnus umbellata*, which formed a handsome spiny shrub, up to six feet high, glistening with silvery scales. It was in splendid flower (strongly fragrant) in May and we saw it again later with its reddish fruits. On fixed dunes near the river were bushes of *Spiraea arcuata*, up to seven feet in height, with long arching branches smothered with sprays of white flowers. A lovely Tamarisk, *Myricaria Wardii*, grew in a dry gravelly stream bed : a shrub of ten feet with elegant fine-leaved branches, the pink flowers were borne on slender catkin-like inflorescences.

We reached the small settlement of Tse on May 30 and halted for four days as we had to pay our respects to the *dzongpon* and ensure his agreement to our plans. Immediately above our camp was a narrow, steep-sided, richly-wooded glen which, somewhat unexpectedly, provided a wealth of fine plants. Many similar valleys open into the Tsangpo from the south and their exploration would undoubtedly yield much of interest. No track led up to the Tse stream and we had to scramble along the rock-choked bed to reach the heights. Not far from camp, in a small grassy clearing at 10,500 feet, very damp and clearly liable to frequent flooding, *Meconopsis betonicifolia* grew in huge clumps in company with *Primula bellidifolia*. The plants were about four feet tall and the sky-blue flowers (four inches in diameter) with the central boss of orange anthers looked more attractive than any I had seen grown at home. Much higher up, at 12,000 feet, I collected the small rosettes of a *Meconopsis* belonging to the *Primulinae* on a mossy clearing in the *Rhododendron* forest and this species was later found in flower in other localities. These were the only Poppies seen, but their comparative absence was amply offset by the abundance of other treasures. The exquisite beauty of one in particular baffles description. I shall never forget my amazement on seeing *Paraquilegia anemonoides* for the first time, and indeed for sheer delicacy, poise and refinement this plant must be supreme. I was stunned by its perfection, as it hung in aged tufts from dry overhanging rocks, the glaucous leaves a beautiful foil to the tremulous pale lilac flowers (Fig. 55). Close by, in similar situations between 11,000 and 12,000 feet, grew another beautiful plant—*Primula Baileyana*. The flowers of this Primrose vary from violet to dark violet-purple and the whole plant is powdered with a fine white farina. Many other plants of distinction inhabited this valley but I must leave them unnoticed as I have much to record from other localities.

We left Tse on June 5, reaching Lusha in two marches, where we camped beside the Lusha Chu amongst masses of sweet-scented *Primula alpicola*, very variable in colour here but mostly the var. *violacea*. *Iris Clarkei* was abundant along the stream side. This handsome species, with white-blotched dark-lustrous-purple falls, mottled in the throat, is a common species in the Tsangpo Valley.

We started from Lusha to climb the Lusha La on June 7. A feature of the valley, as of those of the Tamnyen and Doshong, which we visited later, was the gentle gradient until we had almost reached the main range, when the ascent became abrupt and steep. The rough track, only occasionally used by the Lobas from south of the Himalaya on their bartering journeys to the Tsangpo villages, crossed the river a short distance from Lusha. Fording the river was easy enough on the upward journey but on our return the waters, much swollen by the monsoon, were negotiated only with considerable difficulty and our laden porters crossed with linked arms. We passed through the usual evergreen Oak and Pine forest into mixed Spruce, Larch, Poplar and Birch. There was little of interest in the forest except a Lily ally, *Streptopus simplex*, growing on shady banks in deep moss and it reminded me of a miniature *Nomocharis* with its pendant flowers beneath the leaves. The petals were white or flushed pink and copiously mottled with reddish-purple and some live plants were dug up later and sent home by air but did not survive the journey. Occasionally we crossed extensive grassy flats and bogland which afforded lush grazing for yaks. To these high *drogpas* the Tibetans drive their animals for the summer months, a custom reminiscent of the former seasonal habit in the Highlands of Scotland when families moved with their cattle to the shielings in the mountains.

On our second day's march the path rose steeply and entered the *Abies* forest but at times it ran beside the turbulent river. Small islands and exposed gravel beds were covered with thickets of a fine Tamarisk, *Myricaria davurica*. The bushes were up to six feet high with slender branches bearing small closely packed glaucous leaves and clusters of rich magenta flower spikes. We collected seed of this desirable shrub later in the year. Occasionally the valley broadened into meadows in which many fine plants were gathered. One of these flats was white with an Edelweiss (*Leontopodium himalayanum*). We camped at about 12,000 feet on the upper fringe of the forest. That day (June 8) the monsoon, heralded by sharp thunderstorms, broke in earnest over the main range and eight hectic but glorious days were spent exploring this floral paradise in a perpetual fury of rain. The same conditions greeted us in the other Himalayan valleys. It was not easy to cope with the flow of specimens as every day brought a fresh harvest of plants, though we were a trifle early for the higher alpines. On the slopes of the Lusha Chu, just above camp, I saw *Meconopsis simplicifolia* in magnificent flower. It was scattered amongst bushes of *Berberis macrosepala* and Willows, where, as it did not venture into the open, it was apparently protected from the grazing yaks. The petals varied from sky-blue to deep-blue and the plants were beautifully bespangled with rain drops. On the higher slopes I found *Meconopsis speciosa.* It was growing at 13,000 feet in crevices of dryish rocks with a southern exposure. The delicate silky petals were sky-blue but the plant was not common here though we found it in some abundance on the Sang La a fortnight later.

One of the glories of this pass was *Primula calliantha,* which has been described and figured in the *Quarterly Bulletin of the Alpine Garden Society* (Vol. VII, 238 (1939)). It might be of interest to mention other Primulas collected on this pass: *P. concholoba,* with dark purple flowers, grew amongst shady rocks in *Rhododendron* thickets; *P. rhodochroa,* a charming dwarf farinose species, with pink to cherry-red flowers, brightened damp mossy rocks; *P. Jonardunii* (*tom. cit.,* 237), another farinose mat-forming species with rose-crimson flowers, graced rock-crevices and ledges; *P. chamaethauma* (*tom. cit.,* 231) was abundant on wet avalanche-slopes and open moorland, with a profusion of blue-violet flowers each with a dull orange eye; *P. sikkimensis* var. *pudibunda,* with creamy-white flowers, favoured the soggy avalanche-slopes; *P. vernicosa* (*tom. cit.,* 232), with white or blue-violet flowers, appeared precociously beside the melting snow; *P. Genestieriana,* a beautiful dwarf with violet-purple flowers, colonized sodden snow-fed gravelly soil; *P. minor,* with deep-magenta flowers, grew on gritty soil at the margin of loose screes; *P. glabra,* with pink or purplish flowers, grew on wet grassy flushes; *P. Dickieana* was abundant in the damp meadows, with flowers varying in colour from white through magenta to violet-purple.

The valley was very rich in *Rhododendron* and some idea of the variety may be gained from the following list: *R. anthopogon, R. dignabile, R. fragariflorum, R. Forrestii, R. paludosum, R. pumilum, R. riparium, R. tsariense, R. Wardii.*

The plants mentioned above make a sufficiently imposing list for such a small area, but do not by any means exhaust the riches of the Lusha La. It is impossible to deal here with all the noteworthy species inhabiting the pass, but one or two others deserve notice in view of their potential horticultural merit. Gravel banks and avalanche slopes supported dense clumps of *Diplarche multiflora* which, in habit, strongly resemble our native *Phyllodoce caerulea.* Tight globose heads of pink flowers terminate the vertical shoots and this miniature Ericaceous shrub would certainly appeal strongly to those interested in heaths. In its distribution, *Diplarche multiflora* extends from Sikkim to Yunnan and it would be surprising if attempts had not been made to introduce the species. We returned to the Lusha La in late September and obtained abundance of seed of *Diplarche* but have no record of successful cultivation. Hugging the rocks were low bushes of the rare British species *Cotoneaster integerrima* with the prostrate branches studded with deep red-petalled flowers. *C. microphylla* was also seen in flower.

Two kinds of Cassiope—*C. selaginoides* var. *nana* and *C. Wardii*—grow here and there in profusion and were flowering at their zenith at the time of our visit. Their beautiful, pure-white, campanulate flowers stood out conspicuously in the alpine pastures and on many rock shelves. *C. selaginoides* var. *nana* formed compact carpets in open spaces amongst Rhododendrons and extended into the moorland, where it favoured seams and soil-pockets in moss-covered rocks. *C. Wardii* was a most striking species, forming large colonies on exposed, loose gravel banks and rock-strewn slopes at an altitude around 12,500 feet. It forms an attractive miniature shrub about a foot in height, closely branched and fastigiate, the tightly ranked leaves adorned with long white silky hairs. These Cassiopes, could they be induced to thrive in our gardens as they do in the wild, would gain immense popularity. These remarks apply equally to *Diapensia himalaica*, which surely combines the attributes of an ideal alpine. It forms dense mats of miniature evergreen foliage in the alpine grassland but is equally at home spreading over rock-shelves. The tight cushions are studded with comparatively large flowers of a rich rose-pink. In September, when we returned to collect seeds, *Gentiana Elwesii* and *G. sino-ornata* were flowering beautifully and *G. Sherriffii* was passing into fruit.

This bare catalogue gives a woefully incomplete picture of the gorgeous alpine flora of the beautiful Lusha Chu Valley, and I confess my inability to convey an adequate appreciation of its treasures.

On our return we rested for a couple of days to complete the drying of our collections and enjoy a respite from the ceaseless rain assailing the high tops. Our next objective was the unexplored valley of the Tamnyen Chu, and in one march from Lusha we reached the small hamlet of Tamnyen on June 18. A week was spent in the Tamnyen Chu and an ascent made to the Tamnyen La. Many interesting additions were made to our collections but, somewhat surprisingly, no *Meconopsis* were seen, although conditions appeared ideal for their occurrence.

One plant of special interest, and forging another link between the floras of western China and the Himalaya, was *Vaccinium modestum*, a species previously known only from western Yunnan, where it was discovered by KINGDON-WARD on the Doker La. This engaging dwarf shrub, its leaf-bearing branches never reaching more than six inches above the mossy beds in which a network of stems ramifies, formed carpets on mossy banks and in plashy *Sphagnum* bogs. The greenish flowers, often flushed with pink or red, were solitary and borne on slender pedicels about an inch long. Two large reddish bracteoles almost concealed the flower and persisted until the fruit was mature. In September, when we returned for seed, the plants were even more attractive with the foliage splashed with ruddy autumn tints and with the large glaucous-black globular berries, half an inch in diameter, borne like miniature grapes on rigid stalks.

This valley was perhaps not quite so rich in species as that of the Lusha Chu, yet it supported a luxuriant flora and we collected many fine plants which were new to us. Once again we were subject to continual rain and decided, as our next venture, to cross the Tsangpo to the drier ranges behind the persistent monsoon-screen whence KINGDON-WARD had reported rich populations of *Meconopsis*.

We crossed the Tsangpo by ferrying in two 40-foot dugouts lashed together with bamboo thongs. These were propelled by two large oars with enormous blades, the oarsmen starting each stroke in a standing position and completing it seated. The effort of a few strokes carried the unwieldy craft into the powerful current and it was then allowed to drift rapidly downstream to be guided to the other bank about a mile below our starting point. We walked a few miles down river, crossing an immense sandhill, and made our camp at Sang on an alluvial flat. The Sang La lies at the head of a valley leading to the Rong Chu above Tumbatse. This was the area from which KINGDON-WARD made the bulk of his collections during his expedition of 1924–1925 and he has vividly described the vegetation in his *The Riddle of the Tsangpo Gorges*. His explorations, however, did not include the Sang La and we were on that account rather optimistic about our prospects. Our expectations were not misplaced, as results far exceeded our high hopes. The time, though wet and boisterous, spent on this pass and neighbouring hills was full of excitement as the area was prolific in species of *Meconopsis* and I had splendid opportunities for testing in the field conclusions (reached with some hesitancy) based on study of herbarium specimens and cultivated plants. Altogether six different Poppies were seen in this district.

A short distance from Sang we climbed a rough track through dry evergreen Oak and entered mixed forest. It was rather surprising to find a species of *Primula* flourishing on the sun-baked banks but *P. Jaffreyana* is happiest in such exposed situations. Later in the season we saw abundance of the species, in similar places, in its winter resting state when the rosette leaves were shrivelled and dry, powdering to the touch and the roots were wrinkled and contracted and merely served for anchorage. In the centre was a tiny hard bud with no external appearance of life whatever, but removal of the tight bud scales, however, revealed the minute green germ from which the next year's plant would develop. A number of these desiccated plants were pulled up and brought home, surviving about two months' journey, and produced beautiful flowering specimens in the following year.

Rhododendron telmateium was flowering in the lowest forest and we passed a magnificent clump of *Notholirion hyacinthinum* just coming into flower, the perianth segments lilac-purple with a darker greenish tinge at the base and whitish towards the apex with a green blotch at the tip.

To reach the alpine zone we climbed steeply through mixed *Abies* and *Rhododendron* forest, collecting and photographing many interesting plants on the way. Among the most striking species of *Primula* were *P. Cawdoriana,* in magnificent flower on grassy banks or bare black soil, the pendant violet-purple corolla lightly sprinkled with farina, *P. Baileyana* and a superb form of *P. sinopurpurea* with deep violet-purple flowers.

As we emerged from the forest our hearts gave a leap at the prospect before us; the rolling moorland was a billowy sea of dwarf Rhododendrons and other shrubs. Spires of yellow Poppy flowers pierced this matting and all about were colonies of the sky-blue *Meconopsis simplicifolia* (Fig. 56). Our admiration of the scene was unbounded and we pitched our tents on a broad exposed ridge in the midst of this glorious alpine garden about 200 feet below the Sang La. We were quite oblivious to the sharp sleet showers as we traversed the hill-slopes, eagerly cramming the choice plants into our presses and vascula. Failing light brought our labours on this memorable day (June 28) to a close and as we turned for camp in the gathering dusk we had superb views away to the south beyond the Tsangpo of the mighty snow-range, muffled in an ever-changing cloud mantle.

No locality, except the neighbouring Nyima La, excelled or indeed approached the Sang La for variety and profusion of *Meconopsis.* The most conspicuous plant on the moorland was *M. integrifolia,* whose fountain of yellow flowers rose elegantly through the carpet of *Rhododendron laudandum* and *Potentilla fruticosa* var. *grandiflora* (Fig. 59). At this elevation, about 13,000 feet, the plants were up to four feet in height and very homogeneous in character. All had prominent, slender, cylindrical styles and the ovaries were densely covered with golden-brown adpressed hairs. *Meconopsis simplicifolia* grew in association but was not so prominent, as its flowers barely showed above the hummocky Rhododendrons. Colonies of the species grew in small clearings (Fig. 62). But the most exciting plant was one bearing pure-white to pale-yellow flowers which occurred sporadically in association with *M. integrifolia* and *M. simplicifolia.* At a glance this was recognized as KINGDON-WARD'S Ivory Poppy, which was discovered in 1942 on the nearby Temo La (Fig. 60). In my *Account of the Genus Meconopsis* I tentatively assigned this plant to × *M. Harleyana,* but little did I imagine then that I would have the opportunity of confirming my opinion in the field. The hybrid, in habit and flower colour, was easily picked out and we counted about twenty individuals in the area where the parents overlapped. The Ivory Poppy was not found isolated from both parents. In the majority of the specimens the flowers were borne on basal scapes and the leaves were usually notched, characters which have been derived from *M. simplicifolia.* The flowers were up to five inches in diameter and in texture, shape and colour showed the influence of *M. integrifolia,* though occasionally the petals had a faint flush of mauve from

M. simplicifolia. In its ovary characters, the plant was intermediate between the parents. The capsules of × *M. Harleyana*, in contrast to the turgid state of those of the parents, were narrow and spindly and when opened they showed rows of abortive ovules. All the plants examined were monocarpic and by September had completely withered with the gaping capsules containing powdery undeveloped seed.

In sheltered pockets of black soil in the block boulder scree at 15,500 feet another form of *M. integrifolia* was found. This plant was barely two feet in height, with up to twelve narrow petals, and with the style so contracted that it was concealed by the dark brown hairs of the ovary. Such states have been treated as species by some authors but study of some hundreds of herbarium and cultivated specimens and examination in the field show that the forms of this very polymorphic species merge and do not justify taxonomic separation.

The other species seen on the Sang La were *M. horridula*—the racemose form just coming into flower on the scree slopes: *M. impedita* on earthy banks under *Rhododendron* and bearing intensely violet-purple satiny flowers on spiny basal scapes, and *M. speciosa* (Fig. 61). I remember hearing the late GEORGE FORREST extolling the virtues of *M. speciosa* and he was full of regret that the species had never become established in gardens from his expeditions. Having seen the plant in its native habitat—in boulder scree or in crevices of dry rocks with a southern exposure—I can well understand FORREST'S sentiments. The flowers are usually of a beautiful silky azure-blue, though I saw some plants with rich maroon petals. We collected a quantity of seed of these forms, but apparently no success has attended our attempted introduction.

Remarks on other Sang La plants must be restricted to bare mention of a few other species. *Cassiope pectinata* and *C. fastigiata* grew together amongst dwarf Rhododendrons and the intense blue flowers of *Gentiana tubiflora* var. *namlaensis* and *G. phyllocalyx* made brilliant splashes of colour. A very attractive dwarf *Polygonum*, with a dense spike of pink flowers, grew in turf and on loose earthy screes and *Cremanthodium Thomsonii* and *C. plantagineum* were prominent. A few early yellow flowers had appeared on *Cyananthus spathulifolius.*

On July 1 we struck camp, crossed the Sang La, and descended into the lush Rong Chu Valley. Fine specimens of *Meconopsis integrifolia* (Fig. 66), with flowers six inches across, grew in the moorland but also at much lower altitudes in the *Rhododendron* forest. *M. simplicifolia* also occurred in some abundance on the north side of the pass and the Ivory Poppy was also seen. A rough and, at places, overgrown track brought us to the waters of the Rong Chu which we followed to Tumbatse through rich meadows gay with masses of fragrant *Primula alpicola* var. *luna, Aster tibeticus* and *Iris Clarkei.*

We spent two days at Tumbatse but the weather was so deplorable that we were forced to change our plans and our collecting was confined to the low ground where the plants were chiefly of botanical interest. To add variety to our diet we bought a small yak for about ten shillings and our efficient cook served us with grilled steaks, followed by tarts made from wild gooseberries and smothered with full cream and sugar.

It was now time to return to our main collecting ground on the Himalaya and our route to the Tsangpo Valley led over the Nyima La, which KINGDON-WARD explored in 1924 and of which he gives a glowing account in his *The Riddle of the Tsangpo Gorges.* As we approached the summit of the pass a thunderstorm broke and torrential rain and hail drenched us for nearly an hour. Through the rain screen we could see the snow-capped main range in sunshine. It was from the Nyima La that KINGDON-WARD first reported the Ivory Poppy— " very rare—so rare that we counted only six plants of it, though these were widely scattered." The year of our visit was more favourable— we saw some dozens of × *Meconopsis Harleyana* plants on both sides of the pass wherever the two parents co-mingled. *M. horridula, M. speciosa* and *M. impedita* were also in perfect flower.

We reached Timpa on the north bank of the Tsangpo on July 5 and that evening we enjoyed superb views of the Himalaya. A temporary break in the monsoon had dispelled the clouds from the main peaks and the magnificent cone of Namcha Barwa, with its sierra-like northern spur falling away to the Tsangpo Gorge, was an unforgettable sight. We lingered over our evening meal in the open, enthralled by the changing colour effects on the snow as the setting sun crept up the flanks of the mountain. Later, the peak was bathed in soft moonlight and remained clearly etched against the starry heavens when we retired reluctantly to rest.

We ferried across the river next day and camped at Pe, where the stream from the Doshong La joins the Tsangpo. The extraordinary richness of the Doshong La was first revealed by KINGDON-WARD, and we assumed that the neighbouring Pero La, a little to the east, would hold similar floral wealth. The track over the Pero La into Pemako had fallen into disuse and the path through the forest was almost completely obscured in the undergrowth and jumble of fallen trees. Above the forest we had to traverse a disordered mass of huge, slippery, moss-grown boulders colonized by *Rhododendron, Berberis, Salix* and *Lonicera* species, before reaching the marshy basin at the head of the valley where we pitched our tents in an oozy bog. As I was scanning the slopes above camp with binoculars I picked out a black bear which was apparently amusing itself by knocking down the tall stems of *Rheum nobile* with its forepaws.

On the way up the valley there were few indications of unusual profusion or variety in the vegetation. I collected *Primula szechuanica, Berberis Taylorii, Rhododendron lepidotum,* and the graceful but evil-smelling *Codonopsis mollis* with slaty-blue tubular flowers with a darker network of veins.

The alpine slopes around us looked most promising and we felt certain that they would yield plenty of interest ; but we were to be disappointed and our results did not bear out our optimism. Possibly we were too early for this particular valley, though we judged the season should have been at its height. A great deal of snow remained in the gullies and a biting wind with stinging rain swept down from the pass. We climbed up a steep snow-slope to reach the Pero La to find it choked with snow. A huge cornice overhung on the north side and we climbed up the ridge above the pass to get a glimpse to the south of the main range. Below was a seething cauldron of mist, swirling round the great cliffs, which were weathered at places into ghostly pinnacles. A penetrating wind drove us back to the lee side and we skirted the rocks and scree slopes round the head of the valley. Prostrate plants of the minute shrublet *Diplarche pauciflora* pushed their pink flower-heads through the moss covering of rocks. We descended to a small tarn in the *Rhododendron* moorland, in which *R. campylogynum* with port-wine coloured flowers was a striking constituent and round the margin a species of *Pleurogyne* and *Gentiana cerastiiformis* were flowering beautifully. The most notable plants collected on the Pero La were *Primula Baileyana, P. Cawdoriana, P. rhodochroa* var. *meiotera, P. tenella* (see *Quart. Bull. Alp. Gard. Soc.* viii, 117 (1940)), *P. dryadifolia, Gentiana cerastiiformis, G. Sherriffii, G. tubiflora*, var. *namlaensis* and *Meconopsis speciosa* with rich maroon petals.

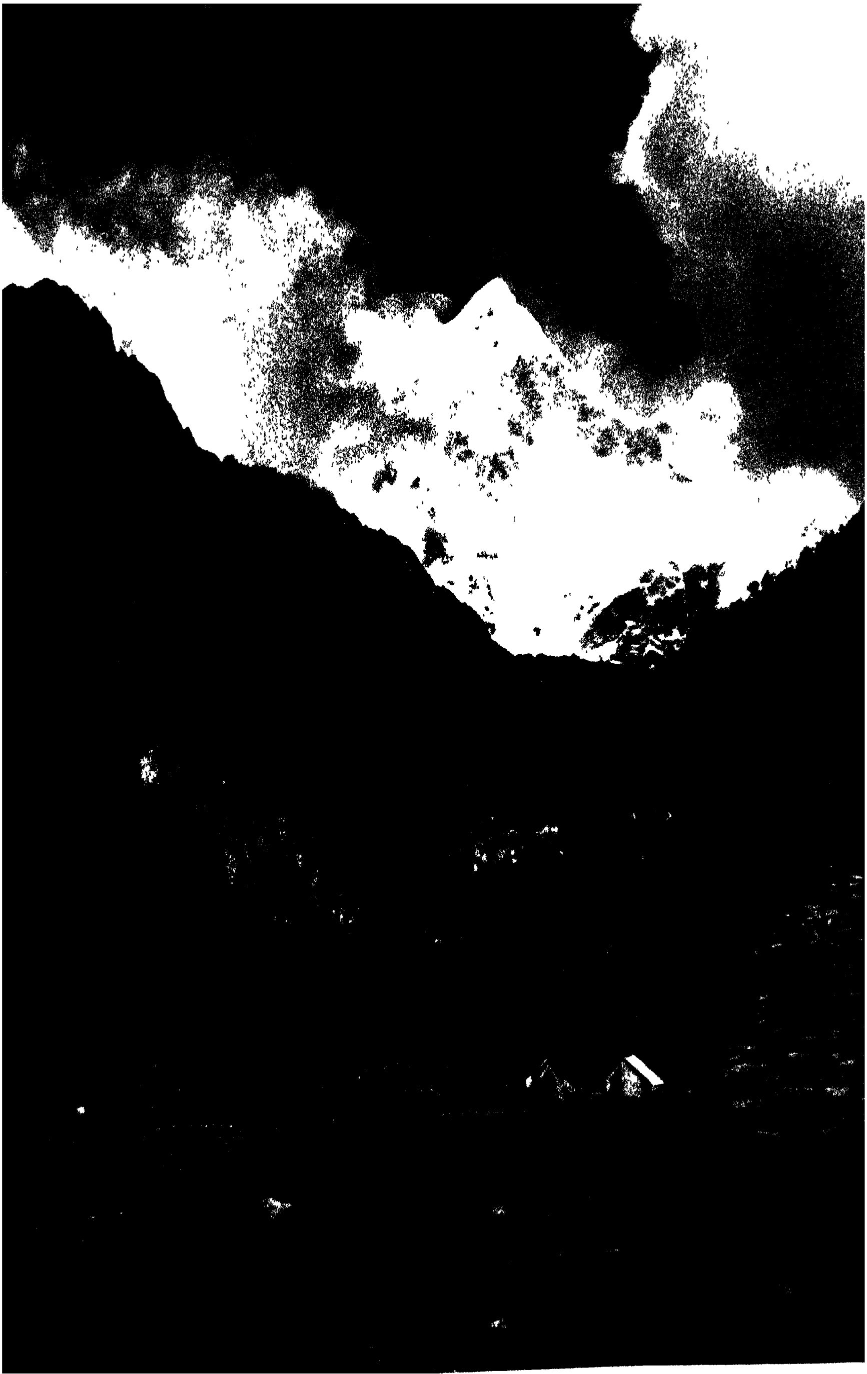
Ordinarily this would have been quite a respectable haul, but our experience on other passes and the super-abundance described by KINGDON-WARD from the Doshong La had pitched our hopes somewhat higher. A day was spent exploring the ridge separating the Pero La from the Doshong La but again the results were disappointing. Far below us lay the Doshong La, which looked a greener valley than that of the Pero La. We were to visit the Doshong La within the next few days and it far outstripped the Pero La in wealth of vegetation.

We descended to Pe on July 12 and next day made camp on the Doshong La on the upper fringe of the *Abies* zone. It is needless for me to attempt to describe the amazing richness of this pass when KINGDON-WARD has given such a brilliant account of it in his *The Riddle of the Tsangpo Gorges*.

As if to compensate for the surfeit of other beautiful plants, *Meconopsis* was only represented by the most inconspicuous member of the genus, *M. lyrata*. The plant has a short radish-like tap root and the weak flowering stem reaches six inches in height though usually it does not exceed four ; the small pendulous flowers have four pale watery-blue petals. It was growing on the banks of a stream under Rhododendrons and also on open slopes in shade of ferns. Seeds were collected in September but if plants were raised it is hardly likely that they would arouse much enthusiasm.

Memories of home were awakened by the sight of a quaking peat bog blanketed with our native Buckbean (*Menyanthes trifoliata*) in perfect flower. The racemes of rose-flushed, white, fringed flowers were quite in harmony with the aristocratic floral setting and we could not help feeling that the beauty of the Buckbean might be more appreciated by gardeners if it could be obtained only in Tibet.

Our stay on the Doshong La was for five days but the weather was cruel and it rained or snowed or there was dense mist all the time.

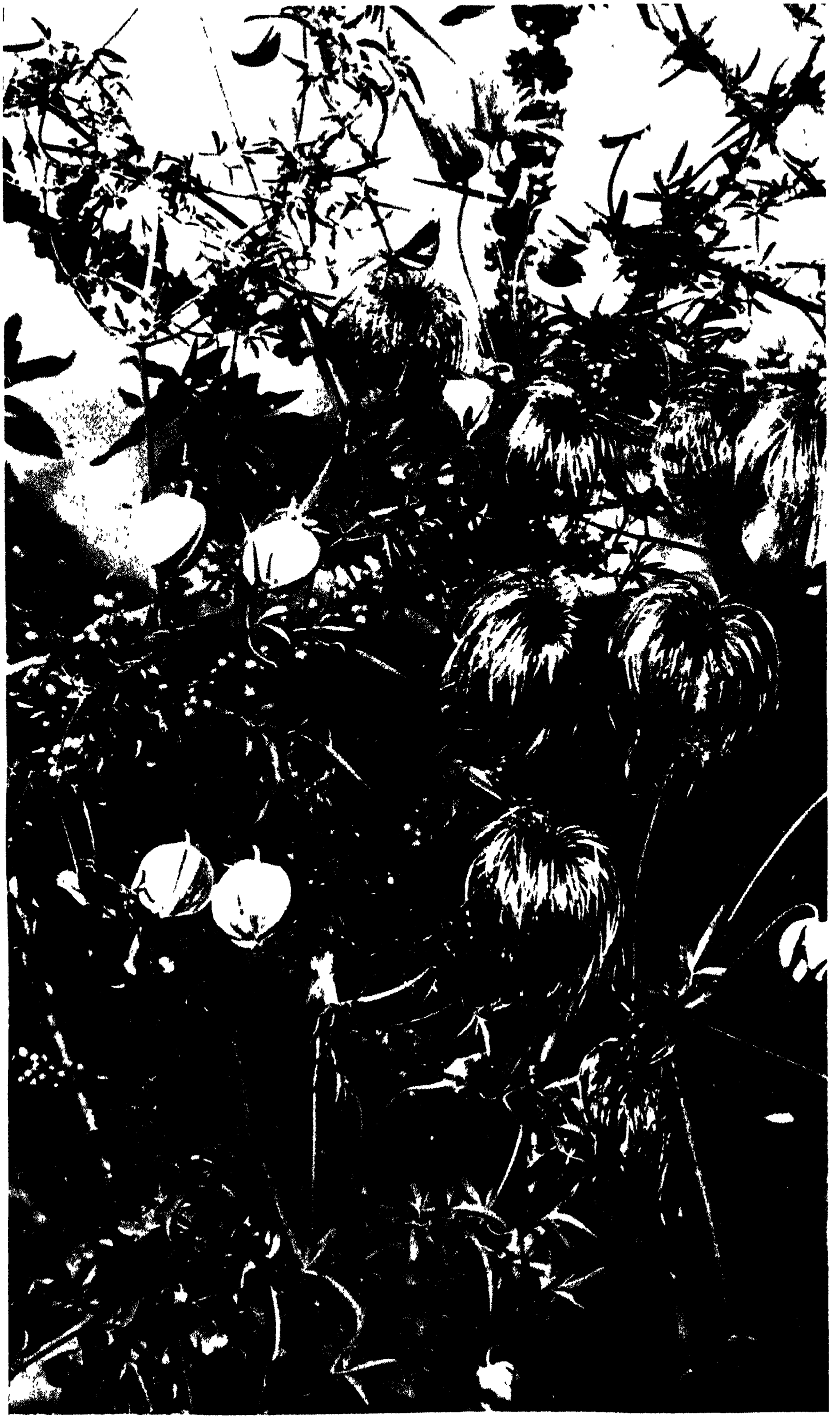


by George Taylor]

PLANT COLLECTING IN SOUTH-EASTERN TIBET

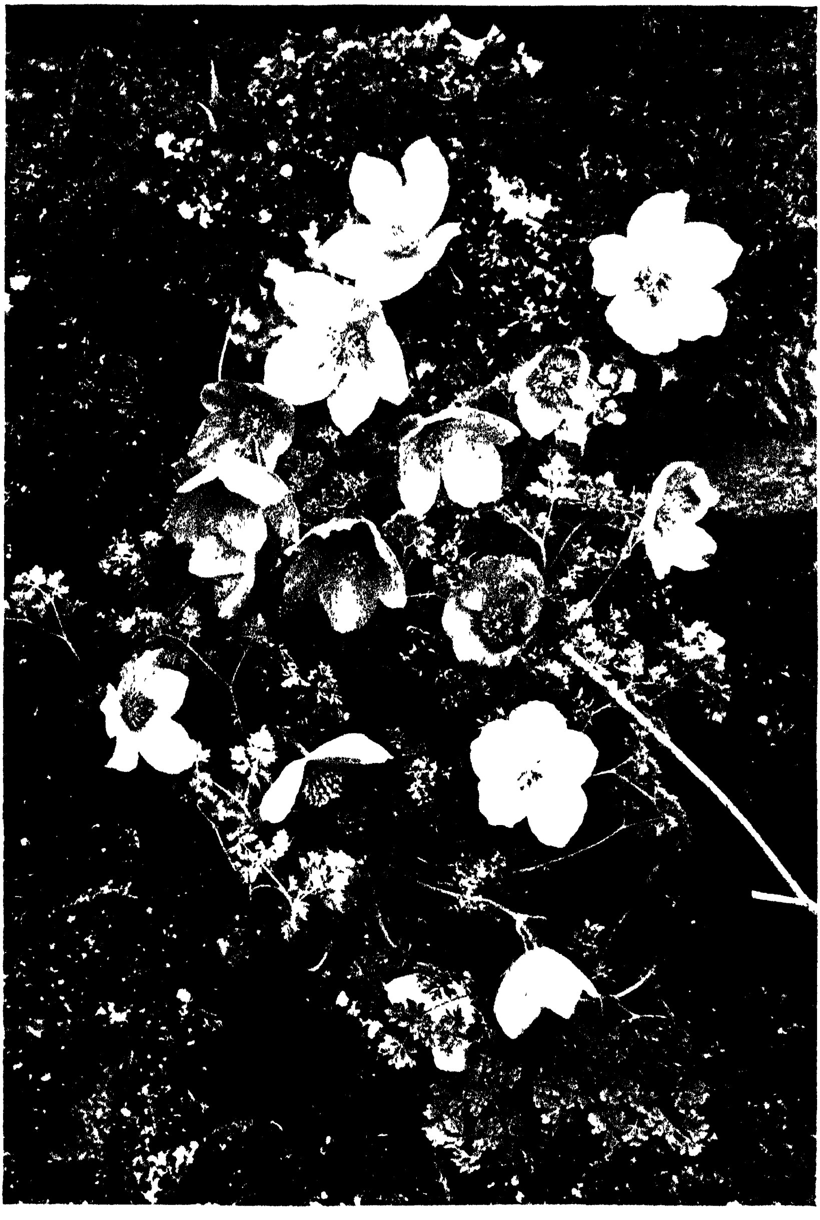
53.—NORTH FACE OF NAMCHA BARWA, 25,445 FEET, FROM TRIPE. THE VALLEY TO LEFT BEYOND THE TREE-CLAD RIDGE IS THE HOME OF MANY BEAUTIFUL PLANTS.

(See p. 143)



PLANT COLLECTING IN SOUTH-EASTERN TIBET

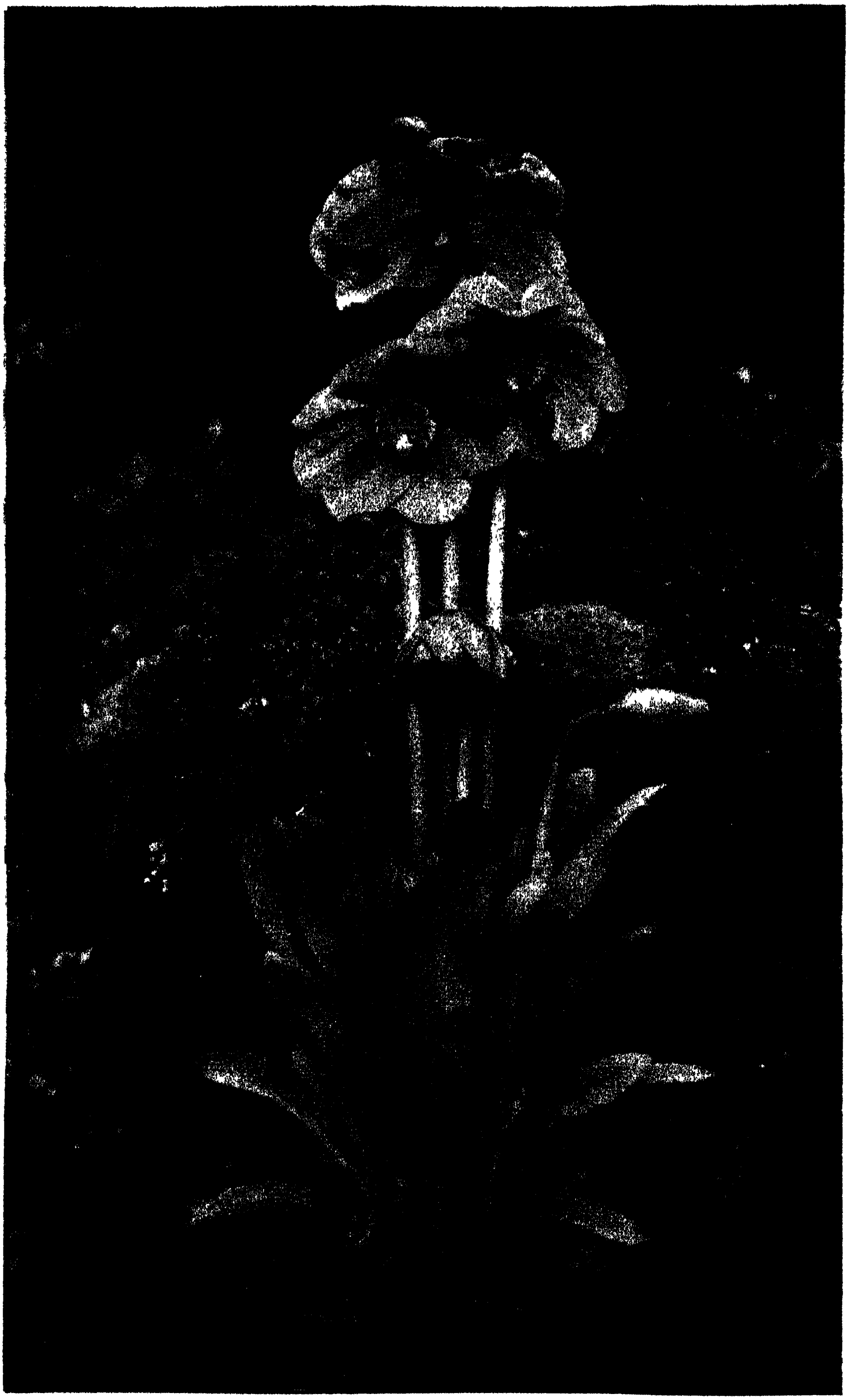
FIG. 54.—CLEMATIS ORIENTALIS IN FLOWER AND FRUIT. THE PLANT IS SCRAMBLING OVER HIPPOPHAE RHAMNOIDES, A NATIVE OF BRITAIN, WHOSE BRANCHES BEAR CLUSTERS OF BRILLIANT ORANGE BERRIES.



PLANT COLLECTING IN SOUTH-EASTERN TIBET

FIG. 55.—PARAQUILEGIA ANEMONOIDES. AN OLD PLANT IN THE CREVICES OF A DRY ROCK FACE.

(See p. 135)



PLANT COLLECTING IN SOUTH-EASTERN TIBET

FIG. 56.—MECONOPSIS SIMPLICIFOLIA

(See p. 139)

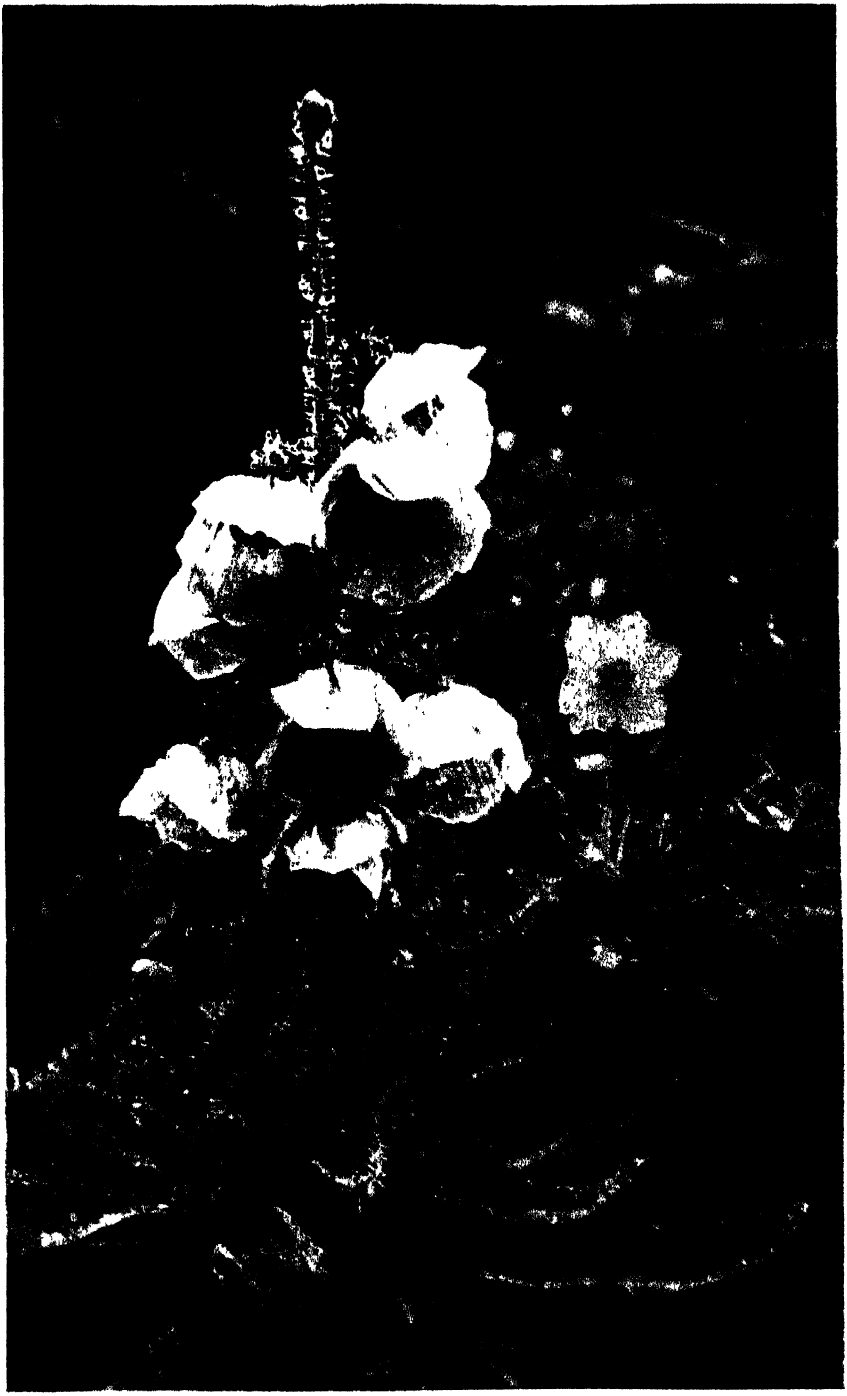


FIG. 57.—MECONOPSIS HORRIDULA AND M. ARGEMONANTHA VAR. LUTEA

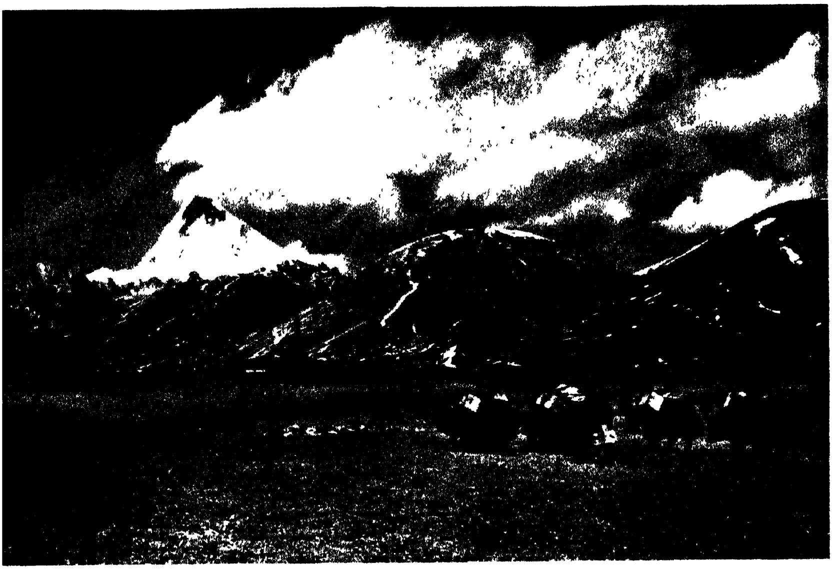
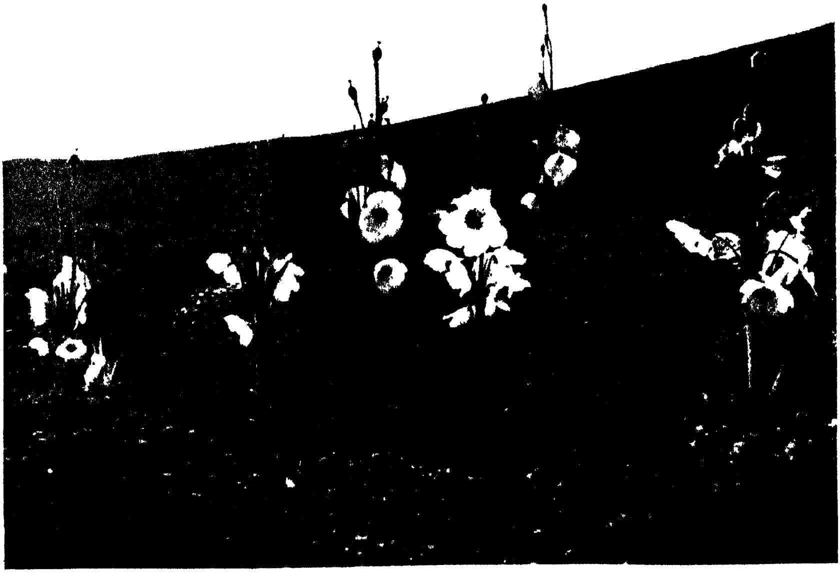


FIG. 58.—CROSSING THE TIBET PLATEAU NEAR PHARI. THE PEAK IS CHOMOLHARI, 24,000 FEET.

(See p. 130)



PLANT COLLECTING IN SOUTH-EASTERN TIBET

FIG. 59.—MECONOPSIS INTEGRIFOLIA ON THE MOORLAND OF THE SANG LA. THE INFLORESCENCES PROJECT THROUGH A MATTING OF POTENTILLA FRUTICOSA VAR. GRANDIFLORA. SEDUM CRASSIPES IS THE PLANT IN FLOWER IN THE LEFT FOREGROUND.

(See p. 139)

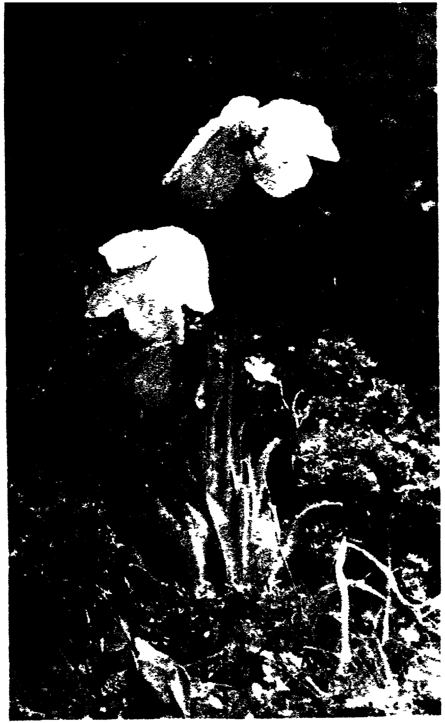


Fig. 60.—Meconopsis Harleyana (M. integrifolia × simplicifolia) on the Sang La.

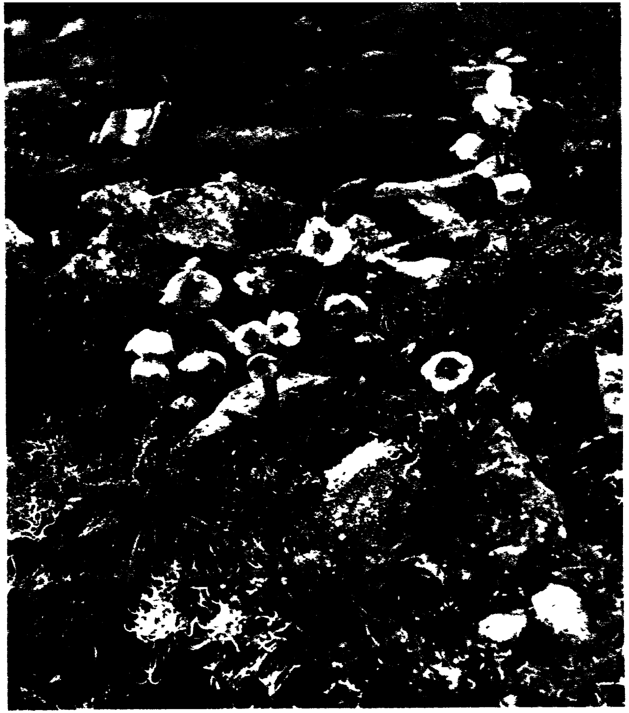
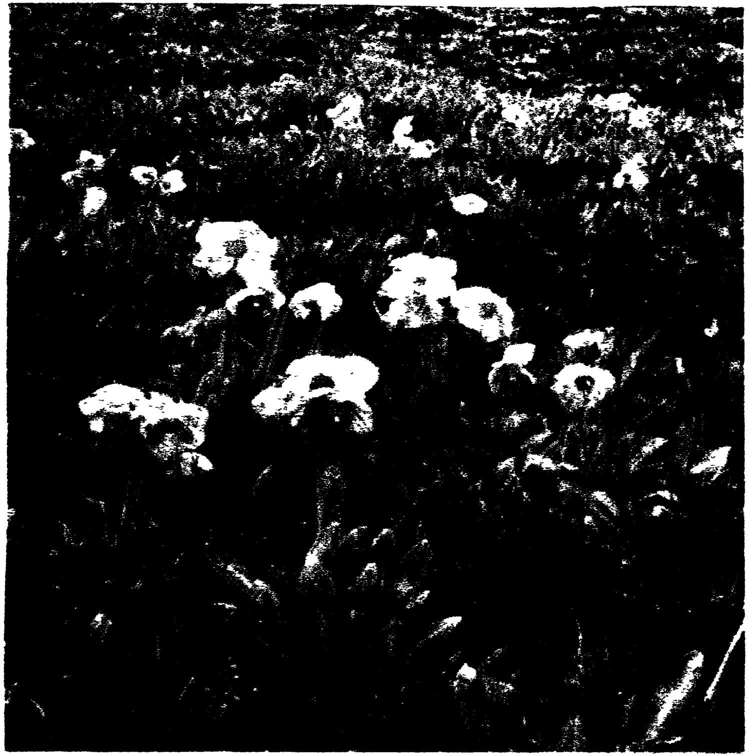
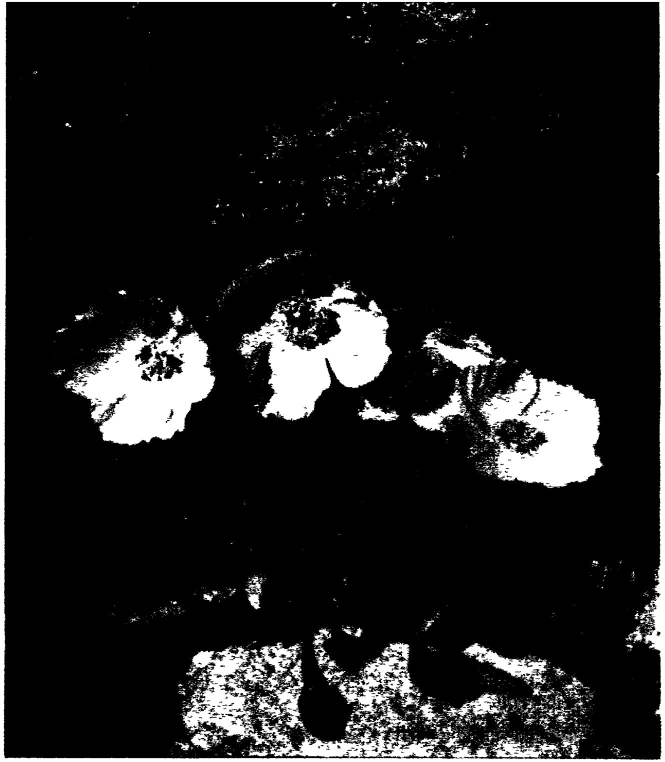


Fig. 61.—Meconopsis speciosa. A group on boulder scree on the Sang La. A single plant of M. impedita can be seen in the centre, behind

PLANT COLLECTING IN SOUTH-EASTERN TIBET

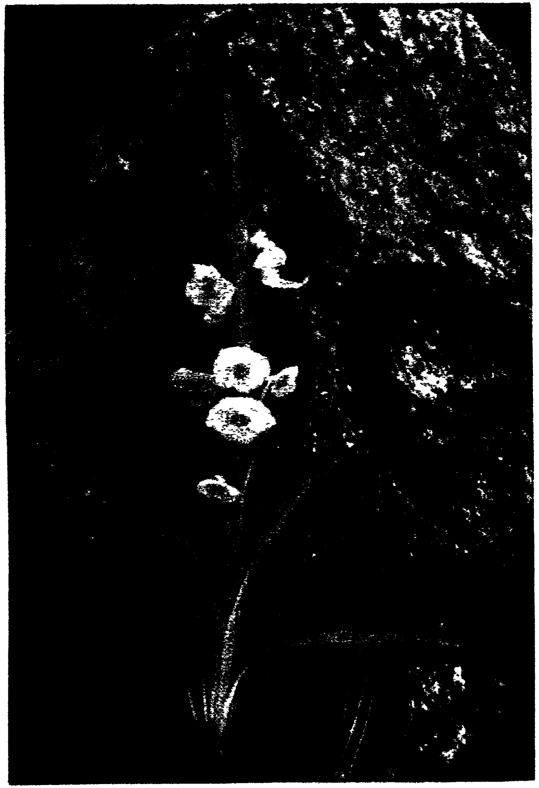


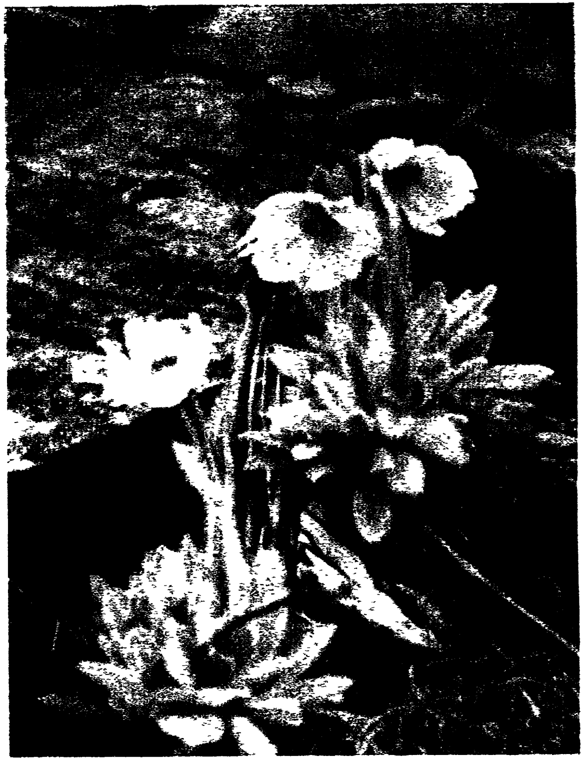


PLANT COLLECTING IN SOUTH-EASTERN TIBET.

FIG. 62.—MECONOPSIS SIMPLICIFOLIA.

FIG. 63.—MECONOPSIS BELLA.

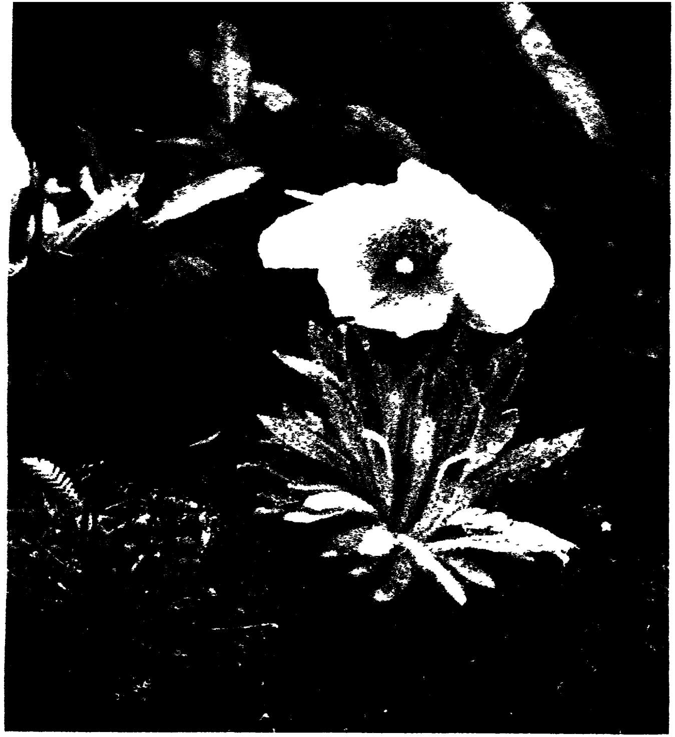




PLANT COLLECTING IN SOUTH-EASTERN TIBET

Fig. 64.—Meconopsis horridula var. lutea

Fig. 65.—Meconopsis Sherriffii.



PLANT COLLECTING IN SOUTH-EASTERN TIBET

FIG. 66.—A FORM OF MECONOPSIS INTEGRIFOLIA ON THE OPEN MOORLAND OF THE SANG LA

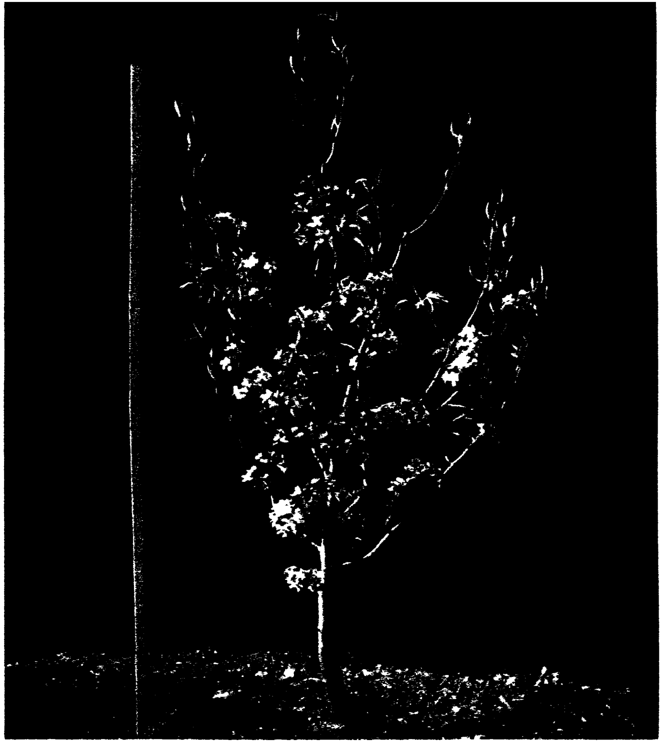


FIG. 67.—DWARF PYRAMID TREE OF DURONDEAU PEAR ON QUINCE C, 4 YEARS OLD.

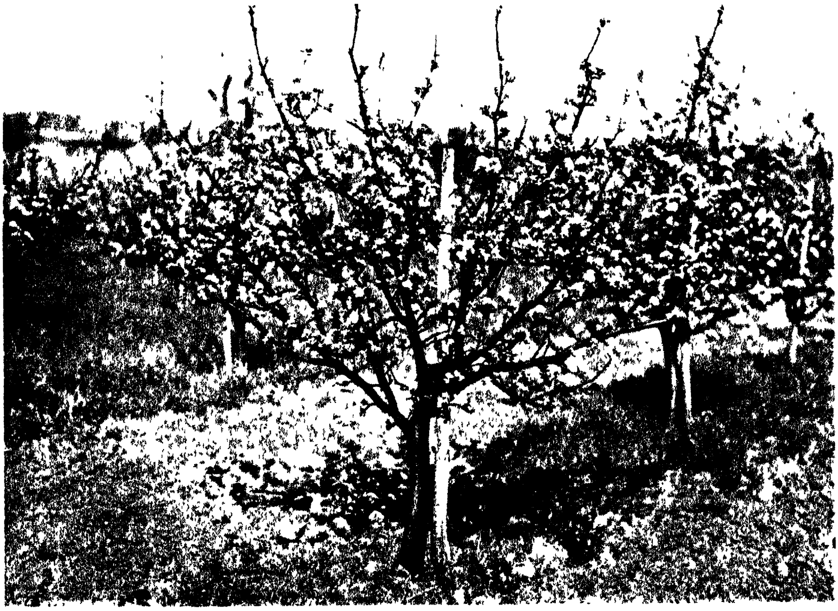


FIG. 68.—DWARF BUSH TREE OF 'BEAUTY OF BATH' ON M IX ROOTSTOCK, 11 YEARS OLD

(See p. 145)

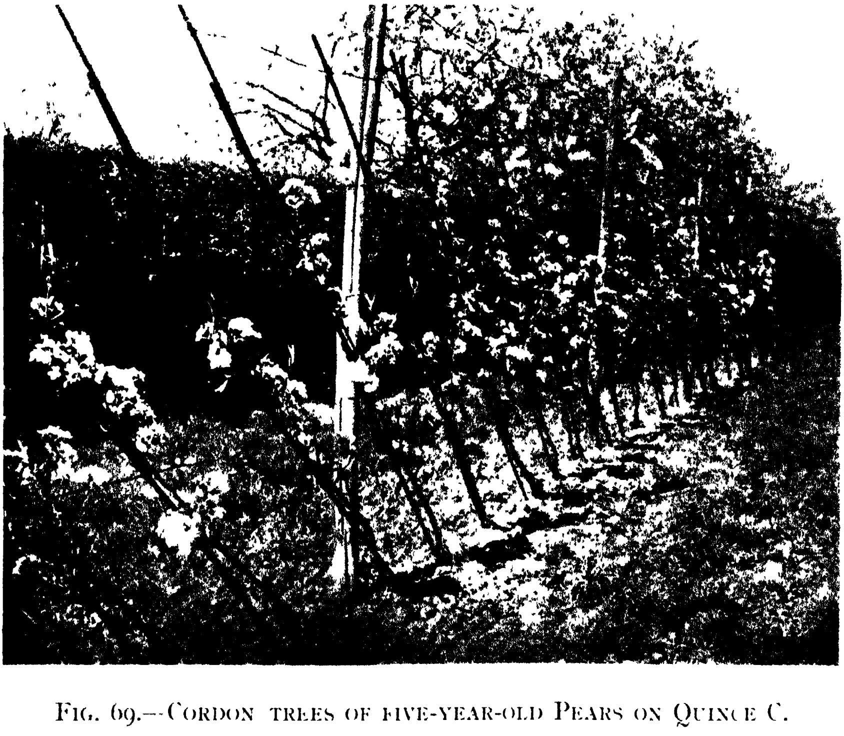


FIG. 69.—CORDON TREES OF FIVE-YEAR-OLD PEARS ON QUINCE C.

(See p. 145)

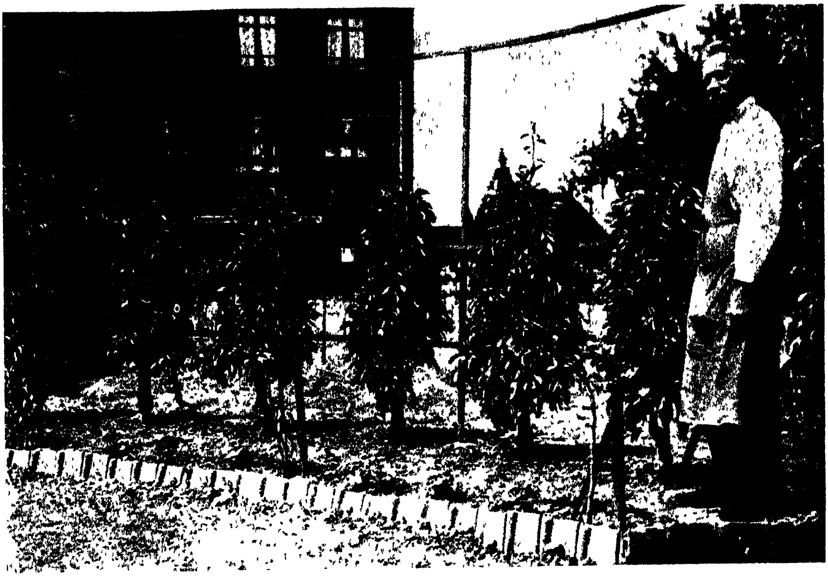


Fig. 70. M. Lorette with some of his fuseaux Pears at Wagnonville.

(See p. 145)

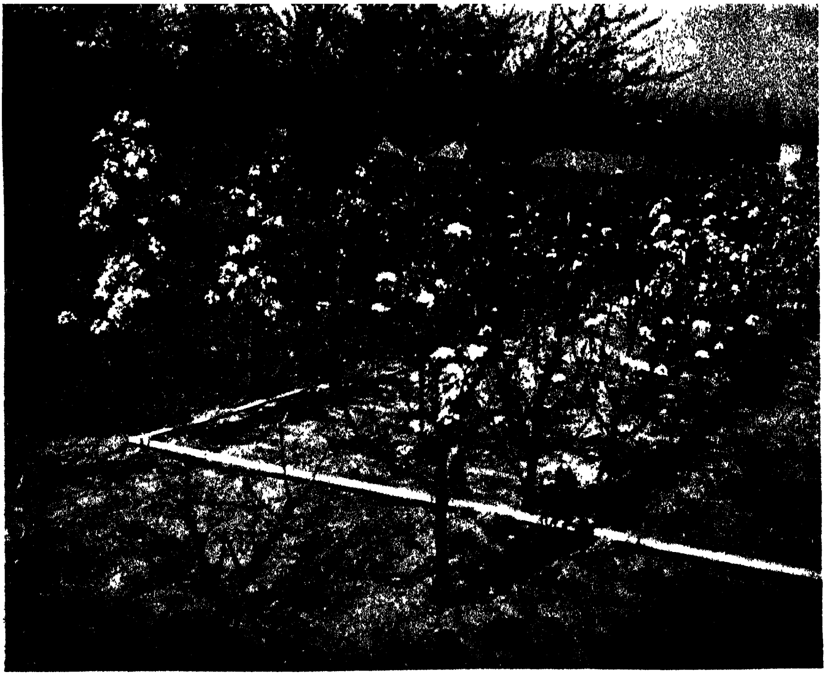


Fig. 71.—Dwarf pyramid or fuseaux Pears on Quince C at East Malling Research Station, 4 years old.

(See p. 145)

The sustained excitement of plant hunting in such a prolific area made us almost unmindful of the uncomfortable weather conditions and it was only the difficulty of preserving our collections which drove us down to the Tsangpo. We had, however, quartered the area pretty thoroughly and descended for some distance into Pemako on the other side of the pass.

On July 20 we set out for Gyala at the head of the Tsangpo Gorge as LUDLOW was particularly keen to investigate the avifauna where the Indian Himalaya terminates and to see whether birds from the south had ascended through the gorge. The area was very interesting botanically but there was little to excite the envy of horticulturists.

At Pe the Tsangpo pursues an unruffled course with no hint of the astounding transformation which occurs within a few miles, where the valley suddenly contracts and the river is forced into a series of rapids. The roar of the convulsed water is deafening, waves shoot up where submerged rocks impede the flow, and huge logs are tossed about as if they were matchsticks.

On the way to Gyala we camped in a delightful meadow at Tripe (pronounced *tree-pay* !) at the foot of a beautifully wooded glen dominated by the icebound peak of Namcha Barwa (Fig. 53). While we were here we had splendid views of the summit-cone and the approach to the mountain was so inviting that we decided to push up the valley and establish a camp near the snows. This was a thrilling and very profitable expedition. We climbed steeply through Bamboo, evergreen Oak and Juniper into the *Picea* and *Abies* zone, and then emerging from the forest we were confronted with the full grandeur of Namcha Barwa. Countless frozen cascades seamed the face of the mountain and there was a continuous tinkle as ice particles sprayed down from the topmost rocks. Two large crevassed and gravel-strewn glaciers, one from the base of the main peak and the other from a lateral valley, merged below the spot where we camped. The dirty tongue of ice thrust down the forest-clad valley towards the Tsangpo between large lateral moraines. This glacier terminates barely a mile from the Tsangpo and on its surface, some distance above the snout, it supports a thin Conifer forest. The small emergent stream was glassy green.

The icy, north-facing cliffs of Namcha Barwa looked entirely barren and it did not seem possible for plants to become established on its inhospitable rocks or gain a foothold on its huge scree chutes. What a contrast was afforded by the south-facing slopes, which teemed with glorious alpines and where the rocks were draped with choice plants !

In a short distance we collected nine species of *Primula*, including a new member of the genus. At 11,500 feet, amongst shady rocks in the forest, we found *P. Maximowiczii*, one of the least attractive species with maroon corolla tube and plum-purple reflexed lobes. On slopes facing south in the *Rhododendron* thicket and on rock ledges there was abundance of *P. Cawdoriana*, though it had mostly finished flowering and some plants had already set seed. Magnificent specimens of

P. Littledalei (see *Quart. Bull. Alp. Gard. Soc.*, VII, 239 (1939)), which it seemed sacrilege to disturb, grew tucked away in crevices under overhanging rocks which shielded the copiously-white farinose plants from direct rainfall. The corolla-lobes were of a deep purple-magenta with a dingy yellow eye. In more exposed situations on the grassy alps and rock ledges *P. Baileyana*, *P. bellidifolia*, *P. gemmifera* and *P. Aliceae* grew luxuriantly. *P. gemmifera* is a very desirable plant, about four inches high with an umbel of deep magenta flowers shading to white towards the centre and with an orange eye. *P. Aliceae*, a new species of the *Souliei* section, was an arresting sight on the grassy rock ledges where it grew amongst bushes of the yellow-flowered *Rhododendron elaeagnoides*. The slender scape bears up to six flowers, which are pale lavender to deep violet-blue with a white farinose eye. Seed was collected in October and the species flowered in this country in 1940 but it has been so intractable that it now seems to have been lost. *P. Walshii* colonized steep earthy scree slopes but it had passed flowering. In similar screes *P. rhodochroa* still showed sufficient flowers to indicate how fine it must have been in its prime. This member of the *Minutissimae* is surely one of the most charming dwarf alpines. It is scarcely an inch in height, forms small tufts with leaves, pedicels and calyx powdered with yellow farina, while the flowers range from pink to cherry-red and are almost half an inch in diameter.

Other attractive plants inhabited the alpine zone. *Codonopsis mollis* with its dainty, light slaty-blue pendulous flowers with dark veining was ideally placed on the high rock shelves while the intense blue flowers of *Cyananthus lobatus* were very conspicuous on steep grassy slopes. The yellow flowers of *C. spathulifolius* were just beginning to appear. On the screes, an Edelweiss (*Leontopodium Jacotianum* var. *caespitosum*) grew in loose spreading cushions: the uppermost leaves subtending the cluster of capitals were attractively tinged with purple. *Gentiana nubigena* was also in flower, with its deep-blue trumpets mottled with dark purple-blue within. Several species of *Sedum* and *Saxifraga* also adorned the rock faces. It was pleasing to find the extremely rare British species *Saxifraga cernua* growing here in quantity—so luxuriant and floriferous that it was difficult to recognize as the weakly plant which leads a precarious existence on Ben Lawers, where its survival depends on the production of small bulbils which normally replace the flowers. Large colonies of *Cassiope Wardii* were conspicuous amongst rocks and seed was collected. It would be interesting to know whether plants were raised of this beautiful species. Dotted about on the steep loose screes was the dainty *Cremanthodium palmatum* subsp. *rhodocephalum* with crimson pedicels and ray florets of the palest pink. Seed of this sub-species was collected later in the year and it may survive in cultivation.

(To be concluded)

INTENSIVE METHODS OF APPLE AND PEAR GROWING

By A. Beryl Beakbane

(East Malling Research Station)

(*Lecture given on July* 2, 1946 : DR. R. G. HATTON, C.B.E., F.R.S., V.M.H. *in the Chair.*)

THE trend towards simplification in form and line in the design of many everyday things can be seen in the development of new forms of tree for garden use. The elaborate fans, espaliers and winged pyramids of former times are giving way to cordons, dwarf bushes and dwarf pyramids. We may still admire the beauty of the older forms and use them occasionally for decorative effect, but lack of time and labour may lead us to chose some form of tree which will bear fruit more quickly and require less detailed care and attention.

The value of a simple tree form, the dwarf bush on a rootstock which will keep the tree very small though growing and fruiting healthily for at least thirty years, has been proved by Dr. R. G. HATTON at East Malling in the course of his work on fruit tree rootstocks (Fig. 68).

We owe the cordon system of cultivation to France where it was largely developed by M. DU BREUIL. Some of the first cordons to be grown in England were planted in 1861 and 1865 by Sir HENRY SCUDAMORE STANHOPE against a brick wall at Holme Lacy in Herefordshire. Cordon trials were planted at East Malling from 1921 onwards (Fig. 69).

The dwarf pyramid form has been used at East Malling in trials of intensive methods of cultivation (Figs. 67 and 71). An early record of trees grown in this shape was made by M. LORETTE who grew fuseaux at Wagnonville from about 1900 (Fig. 70). The pioneer work in developing the dwarf pyramid system in England was carried out by Mr. A. H. LEES and his system has been further modified by Mr. A. D. TURNER in his trials at the Somerset Farm Institute at Cannington. These systems differ considerably from that used by M. LORETTE, especially in the treatment of the lateral shoots.

A tree of similar shape to the dwarf pyramid though considerably larger is grown widely in the Rhineland under the name of Spindelbusch. The rootstock most commonly used is M.IX. The trees are planted farther apart and less summer pruning is practised than is usual under the English dwarf pyramid system. The branches are trained horizontally by tying them down to the main stem with string or bending them down with metal clips.

Although strictly speaking the intensive cultivation of Apples and Pears has as its aim the production of a high yield from a small area of ground, there is, as yet, little experimental evidence as to whether an acre of dwarf trees with from 2,000 to 4,000 trees per acre would yield more or less fruit at maturity than an acre of large bushes or standards with about forty trees to the acre. There is, however, plenty of evidence that the small trees would come into bearing first and yield higher crops in the early years provided they were on suitable rootstocks. Trees in our cordon trials at East Malling have yielded a crop equivalent to 700 bushels per acre at ten years old which would be a good yield for any type of tree. The productiveness of a given area of land may also be considered to be increased by the use of intensive methods on account of the higher proportion of first-grade fruit which is normally present in the crops from intensive as compared with extensive trees.

In planning a garden we may decide to devote from $\frac{1}{20}$ to $\frac{1}{10}$ of the area to Apples and Pears. Examples within this range would be 1½ rods in a garden of ⅛ acre or 6 rods in ½ acre. Even the larger of these spaces could be filled by one large tree if we chose a tree on a vigorous rootstock and allowed it to develop to its full extent, whereas with cordon trees on dwarfing rootstocks we could have up to 100 trees in the same space. This would make it possible to grow a good selection of varieties, and for most people it would provide more interest than could be derived from a single tree. Since the choice of varieties is a personal matter varying with individual preferences for particular flavours and textures, no list of varieties suitable for intensive methods is given here. The Royal Horticultural Society's leaflet entitled " A Selected List of Hardy Fruits for Private Gardens " may be used as a general guide. Trials at East Malling have shown that, contrary to popular opinion, even a tip-bearing variety of the somewhat intractable habit of 'Worcester Pearmain' can be grown successfully by intensive methods provided the right rootstocks and pruning methods are used. Therefore although it would be wise to choose as many as possible of the spur-bearing varieties, such as 'Cox's Orange Pippin,' rather than the tip-bearers of more straggly habit, such as 'St. Everard' and 'Cornish Gillyflower,' some of these may be included where the fruit is of high quality. With Pears it is best, where possible, to choose varieties of compact growth such as 'Conference' rather than very upright and vigorous kinds of which 'Beurré Superfin' is an example.

The question of pollination must be borne in mind when choosing varieties. This subject has been fully studied by Mr. M. B. CRANE at the John Innes Horticultural Institution and his results published in their leaflet No. 4, " The Fertility Rules in Fruit Planting." The information in this leaflet is of the greatest value to those who are planning a fruit garden.

One of the most important of the initial choices is that of rootstock. Fortunately the recommendations can be very simple for intensive Apple and Pear trees; although many new rootstocks are being tested for Apples and may eventually provide some which are especially suitable for intensive trees. At present, however, for dwarf bushes on most soils one may recommend M.IX for any Apple variety except ornamental Crab Apples. M.IX is also the most suitable rootstock for cordons of all spur-bearing varieties. Trials at East Malling have shown that for varieties which tend to produce bare wood when grown in the cordon form it may be wise to choose a more vigorous rootstock such as M.II or M.VII which will tend to encourage the development of more vegetative buds and to furnish the cordon with lateral shoots which can be pruned to form fruiting laterals. M.II and M.VII are also suitable for dwarf pyramids and can be grown without any form of support, although where some simple support such as a single wire can be provided, dwarf pyramids can be grown successfully on M.IX and will bear fruit earlier in their life than trees on more vigorous rootstocks. For large espaliers and other elaborate forms a rootstock at least as vigorous as M.II should be used.

The relative vigour and fruiting of Apple cordons on six rootstocks is shown in Diagram 1 from which it can be seen that trees on M.IX gave the highest crop while requiring the least labour in pruning. Trees on M.II also fruited well, but they did not come into bearing at such an early age as those on M.IX and required considerably more labour for pruning.

For Pears, Quince A or C would be the most suitable rootstocks, remembering that certain Pears such as 'Williams' Bon Chrétien' should be double worked as they prove to be incompatible when budded directly on to the Quince stock.

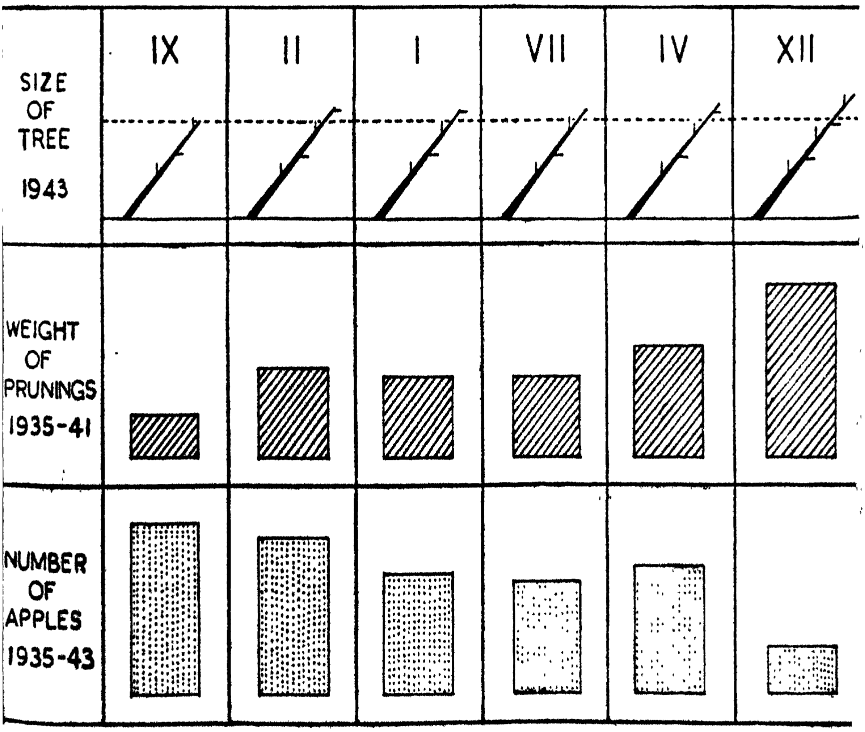


Diagram 1.—Comparison of Rootstock Effect on the Vigour and Cropping of Apple Cordons.

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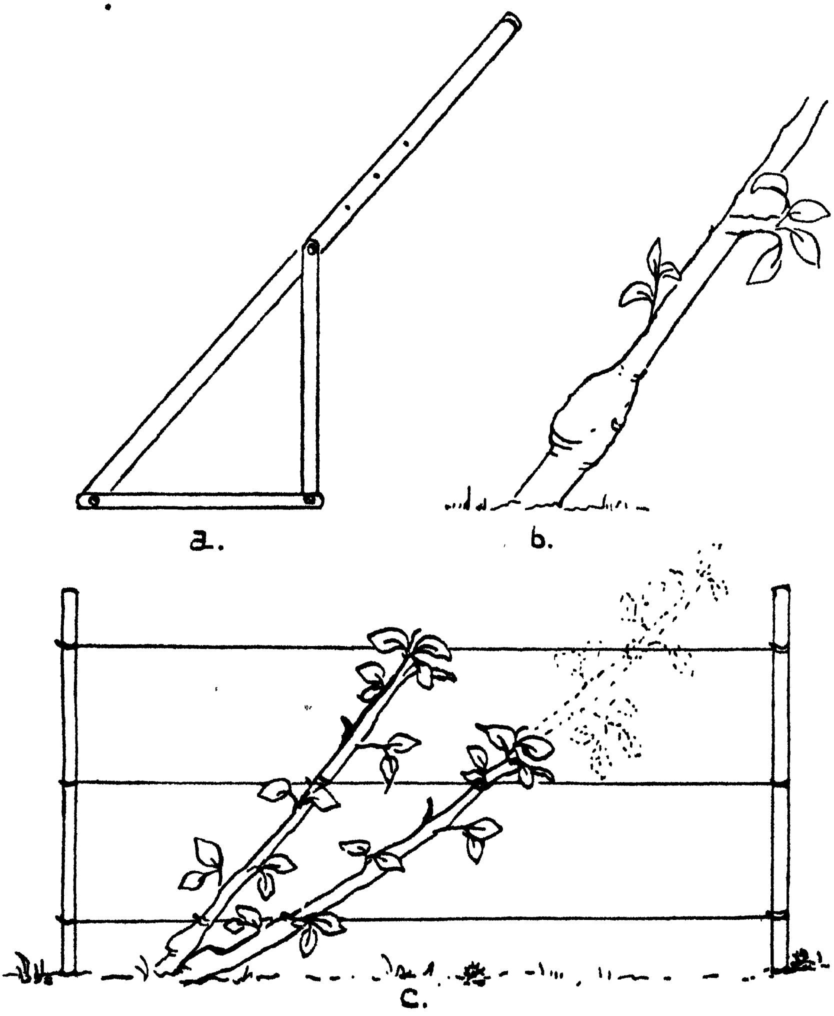
In choosing the exact type of tree for a garden the merits of the different forms may be considered. The single oblique cordon normally bears fruit earlier in its life than either the dwarf pyramid or bush. As against this advantage, however, we must set the difficulty of providing the elaborate erection of poles and wires needed to support cordons. Dwarf bushes are relatively easy to stake and dwarf pyramids may often be grown without stakes.



Drawings by Barbara M. Stokes]

DIAGRAM 2.—ILLUSTRATING METHODS OF PLANTING AND TRAINING CORDON TREES. (See Text.)

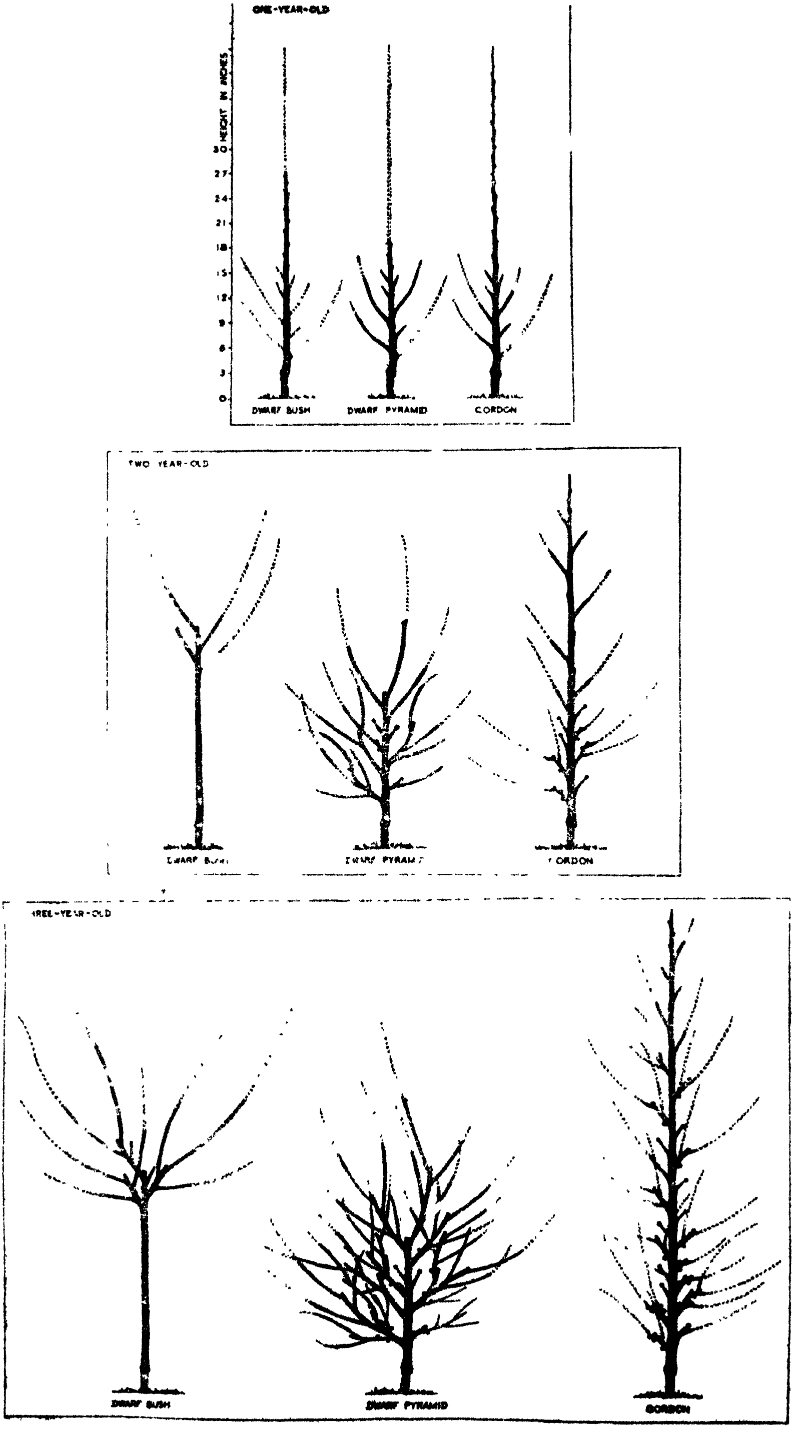
Trees for all three forms described should be planted with the unions about 3 inches above ground level to prevent scion-rooting. If roots of a vigorous variety are allowed to develop above the union one may lose the control over growth and fruiting which is so essential for intensive cultivation and which may be obtained by the use of suitable rootstocks. Cordon trees should be planted in a position which will ensure that the scion is on the top side when the tree is bent over (Diagram 2 b).

Cordons may be planted at an angle of 45°. In our trials no difference in growth and cropping occurred between trees planted at an angle of 45° and those planted upright and bent to an angle of 45° at the end of the first summer; whereas the former trees were the easiest to train and manage. A home-made wooden set-square may be used to align the trees on the trellis (Diagram 2 a). Cordon and dwarf pyramid rows should run north and south if possible. The trees should be planted on the leeward side of the trellis to prevent rubbing through the trees blowing on to the wires. Canes may be tied to the trellis with paper covered wire, but the trees are normally tied to the canes with soft jute string. We have kept the trees in our trials straight from base to tip instead of bending the tip along the top wire as is sometimes done. When this method is used the trees must be lowered every few years, as shown in Diagram 2 c, to allow for growth in length.

The effect of distance of planting was tested with cordon trees. Close planting was found to restrict vegetative growth and increase fruiting. The closer of the two distances tried was found to be too close for ease of management and the wider distance wasteful of space with the more dwarfing rootstocks. In gardens where hand cultivation is carried out a suitable distance for cordon Apples on M.IX or Pears on Quince A or C would be 6 feet between the rows with from 2 to 3 feet in the rows according to the soil. For Apples on M.II, 3 feet in the rows would be needed on most soils. Dwarf pyramids, even on M.IX, should be set out at 3 feet by 6 feet in small gardens where hand cultivation is practised. In large gardens or small commercial plantations the distance may be increased to allow for the passage of machinery. It should be remembered, however, that severe root competition due to close planting is one of the means used to restrict vegetative growth and encourage fruiting in the cordon and dwarf pyramid systems and if it is decided to space the trees farther apart either through shortage of trees or a preference for a wider plant, it might be wise to choose the dwarf bush form at 8 feet to 10 feet apart in both directions.

Since intensive systems of cultivation aim at producing heavy crops of fruit from a relatively small area of land the soil should be in good heart and receive adequate manuring. Restriction of vegetative growth can be achieved by the choice of a suitable rootstock, planting distance, pruning method and cover crop and the good food given by manuring directed into the production of fruit rather than shoot growth. Normally some organic, as well as inorganic, manure is required and on dry soils a mulch of dung or compost may be needed from time to time.

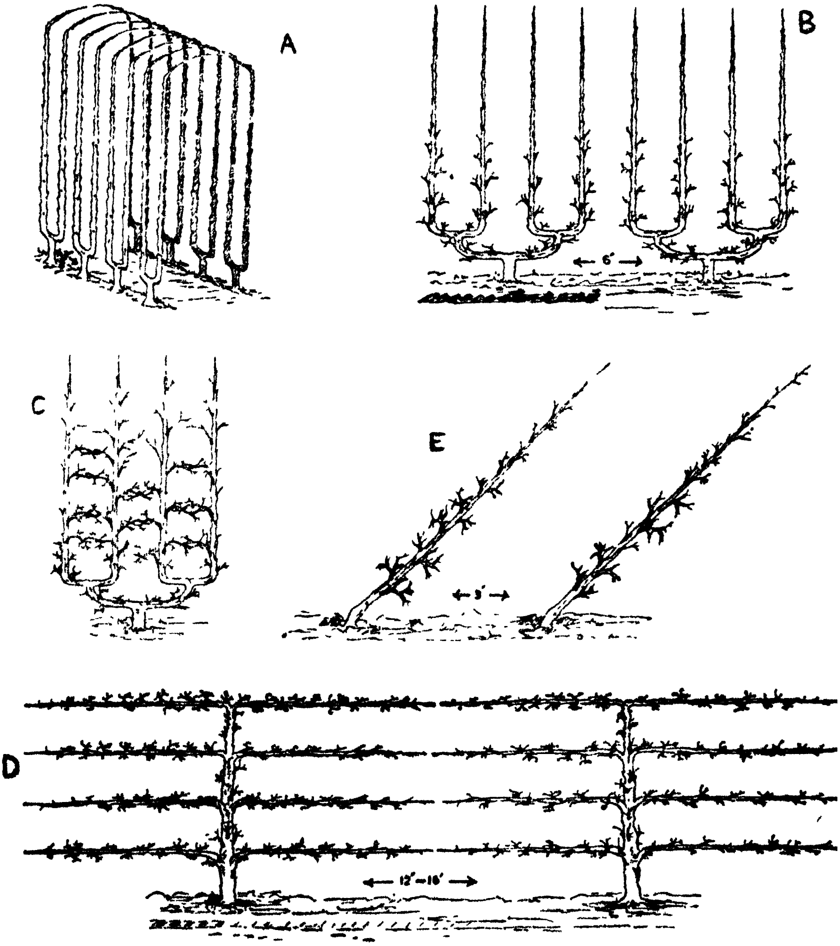
The cultural operation which is often of greatest interest to amateurs is the pruning. Many different methods may be used successfully.



Drawings by Eleanor C. Thompson]

DIAGRAM 3.—DIAGRAM ILLUSTRATING METHODS OF PRUNING YOUNG TREES IN THEIR FIRST, SECOND AND THIRD YEARS TO FORM THREE KINDS OF TREE FOR GARDEN USE.

Part of the pleasure derived from growing trained trees may be obtained by the choice of a pruning method which suits not only the growth conditions of the soil and rootstock-variety combination, but also the particular inclination of the pruner. In the treatment of the lateral shoots as well as in the general build-up of the tree there has recently been a tendency towards simplification of design. Whereas in the past many complicated prunings and pinchings were advised, we have found that we can grow good crops with two or sometimes only one pruning in summer. The simplest form capable of bearing heavy crops is obviously the most desirable. With this aim in view



Drawings by Eleanor C. Thompson]

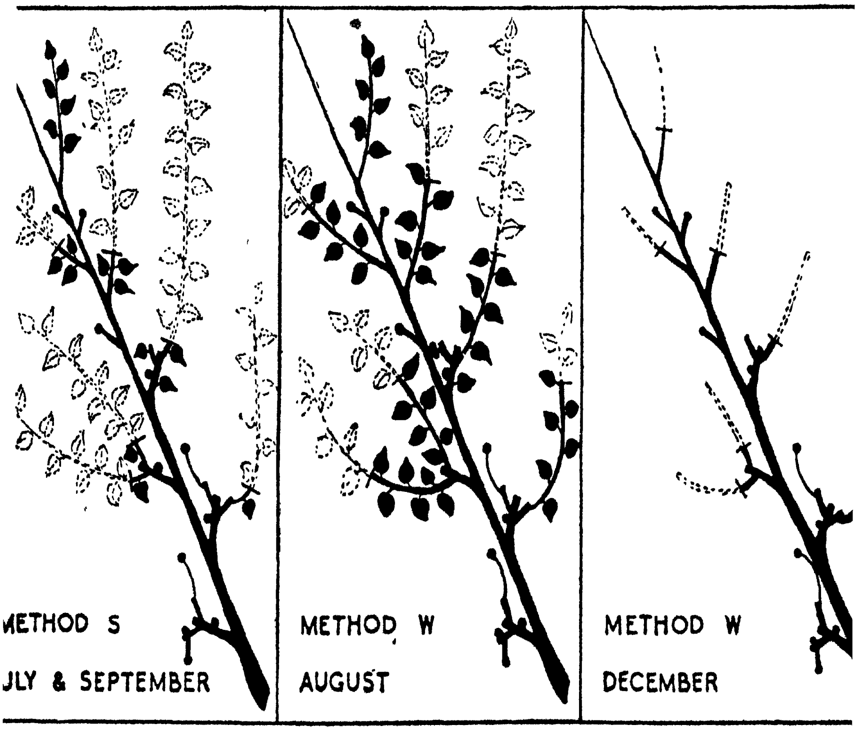
DIAGRAM 4.—DIAGRAMMATIC REPRESENTATION OF SOME SIMPLE FORMS OF TRAINED TREES.

A. single U espaliers used as an arch.
C. double U espalier with interlacing branches.
B. double U espaliers.
D. horizontal espaliers.
E. oblique cordons.

it is possible to achieve grace and simplicity of design in healthy, fruitful trees.

Methods of building up a dwarf bush, a dwarf pyramid and a cordon from a maiden, or one-year-old, tree are illustrated in Diagram 3, which shows the clean stem of a bush tree, the shrubby habit of a dwarf pyramid and the pillar formation of a cordon. The general shape of some simple forms of trained tree at maturity are illustrated in Diagram 4.

Two methods of pruning the lateral shoots of cordons are illustrated in Diagram 5. The pruning treatments are referred to respectively as methods S and W: S representing summer and W winter, since all the pruning in the first method was given in summer, while in the second a large part of the pruning was carried out during the dormant period, and only a relatively light pruning given in late summer. With method S the pruning was carried out about mid-July and mid-September; at these times mature laterals from the main stems were cut back to about 3 inches and laterals from existing side shoots to about 1 inch. After the trees were five years old it was rarely necessary to carry out any pruning in September as very little secondary growth occurred.



wings by *Eleanor C. Thompson*]

GRAM 5.—DIAGRAMMATIC REPRESENTATION OF TWO METHODS OF PRUNING TREES—S IN JULY AND SEPTEMBER AND W IN AUGUST AND DECEMBER.
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With method W the trees were pruned in August and again about the end of December. During the first week in August all the laterals were cut to 6 or 7 inches. In December, laterals from the main stem were cut back behind the summer pruning cut to 3 inches and those from existing side shoots to 1 inch. With both methods the leading shoot or extension growth of each cordon was not cut either in summer or winter. More fruit was obtained from trees pruned by method S than from those pruned by method W with both 'Cox' and 'Worcester' the difference being more marked with the latter variety.

Two methods of pruning dwarf pyramid trees have been used at East Malling. The treatments are referred to as L and S for convenience, indicating that the lateral shoots were left fairly long with method L and cut shorter with method S. The treatment of the lateral shoots in method S is the same as in the cordon pruning method described under the same letter.

With method L the maiden trees were cut to 20 inches in April and any lateral shoots (feathers) present on the maiden were pruned to about five buds choosing an end bud pointing in a downward or outward direction. The following summer and thereafter any laterals and branch leaders over 12 inches in length were pruned to about five leaves in mid-July. In counting the leaves the cluster of small leaves which often occurs at the extreme base of the shoots was omitted. At the end of the growing season any secondary shoots were cut to their point of origin.

With method S the maiden trees were cut to 20 inches in the dormant season. At this time the lateral shoots were pruned to about half their length. The following summer and thereafter the lateral shoots were pruned to three leaves when arising from the main stem and to one leaf when arising from an existing side shoot. If secondary growth occurred the process was repeated in September. This was found to be unnecessary except with very young trees or occasionally with older trees in wet summers. During the dormant season the central and branch leaders were cut to about half their length, the amount removed being adjusted to ensure that the tip of the central leader was higher than that of any of the branch leaders. With both systems the central leaders were pruned in consecutive years to buds pointing in opposite directions in order to maintain a vertical stem. When the trees reached about 7 feet in height the central leader was cut to about half its length in May instead of in the dormant season, and from then on any shoots arising from the top of the trees were pruned to ½ inch in May to restrict their growth. Branch leaders were cut to ½ inch in May when the end of the branch reached a position about 18 inches from the central stem in a horizontal plane, *i.e.* when branches of adjacent trees touched along the row. No thinning out of the fruiting laterals was done up to the tenth year but this may be needed in future years. Trees pruned by method L were a little smaller and tended to be more fruitful than those pruned by method S.

If the pruning and general management has led to a good crop the problem of thinning the fruit will arise. We have indications from a preliminary trial on cordon trees that it is safe to thin as early as the end of May. Early thinning has the advantage that the food is directed into the fruits which will ultimately remain. One need not be afraid of early thinning to one fruit per truss on dwarf trees provided they are well nourished, though occasionally trees in a poor state of health may discard their fruits more freely and leave too few for a satisfactory crop.

Adequate covering with spray materials may easily be given to small intensive trees and it is therefore possible to use spray mixtures which are slightly weaker than is normal for large trees and, in particular, to use those which are free from any risk of damage. This practice is recommended because each individual bud is of greater importance in trees of restricted form than in larger trees. On the other hand a sharp watch must be kept for aphis and other pests which may cripple shoots required to build up the main branch skeleton, especially with espaliers where the branches should be evenly spaced. The development of some pests and diseases will be retarded by the severe pruning by which much of the one-year-old growth is removed. The prevalence of at least one disease, viz. perennial canker *Gloeosporium perennans* may, however, be increased by summer pruning. This disease has not caused any appreciable trouble at East Malling, but has been noted to be severe on summer pruned trees in some districts.

If the trees have been well planted, manured, pruned and carefully but lightly sprayed they may need a slight check in the form of a cover crop at about 3 years old or a little older. This will also increase the organic matter in the soil. A cover crop containing clover is more suitable than a pure grass mixture which may restrict growth too much. The following mixtures are suitable for garden use.

		oz. per rod
(1)	Rough or smooth stalked meadow grass	1
	Perennial Rye Grass	1
	Broad Red Clover	1
	Wild White Clover	½
	Sheep's fescue	½

		oz. per rod
(2)	Rough or smooth stalked meadow grass	2
	Wild White Clover	2

The cover crop may be sown in March or September either over the whole area or as "grass paths" between the tree rows. Once the sward is established it will need to be mown at approximately monthly intervals from April to October. The mowings should be allowed to remain under the trees. A nitrogenous manure such as nitro-chalk should be applied in February at the rate of 2 lb. per rod to stimulate the growth of the cover crop and assist in feeding the trees.

In conclusion, while it is true that the systems of cultivation described above are not suitable for commercial production on a large scale, they have proved to be of value for garden use and the growing of these small trees can form an absorbing as well as a healthful hobby.

THE LEAF-ROLLING ROSE SAWFLY, *BLENNOCAMPA PUSILLA* KLUG.

By G. Fox Wilson
(Entomologist, R.H.S. Laboratory, Wisley.)

THE number of enquiries relating to the cause of tightly laterally-folded leaves on Bush and Climbing Roses has increased in recent years, and Rose leaves damaged by this pest have been received from most English and from a few Scottish counties.

The injury caused by this pest—known as the Leaf-Rolling Rose Sawfly or Rose Leaf-Roller (*Blennocampa pusilla* Klug.)—is frequently confused with the damage caused by the so-called " Rose Maggots," which are the larvæ of certain species of Tortricid Moths (THEOBALD 4). The effect of both pests is disfiguring but, while the damage by Tortricid caterpillars is that of a partial rolling, injury by this Sawfly is a complete and lateral folding of the leaflets (Fig. 1). The result of an attack is that the plants lose vigour owing to the natural functions of the leaves (assimilation and respiration) being hindered and, in severe attacks, the foliage falls prematurely after becoming scorched in appearance.

This pest was referred to by THEOBALD (3) as long ago as 1907 on wild Roses with the statement that its presence on " cultivated Roses is however rare ". This author, together with certain others, appeared then to consider that the rolling is mainly accomplished by the larvæ, and that it was the immature larva alone that produced the effect. CAMERON (1), however, stated that the rolling down of the two sides of the leaf is due to the larva, but aided by the incision made by the female Sawfly when laying eggs. A close observance of the habits of this Sawfly will show that the rolling of the leaflets is due to some toxin that is injected into the leaf tissue at the time the egg is deposited. This statement is established by the fact that the two sides of the leaf react to the irritant some days *before* the eggs hatch, and will occur even on those leaflets that have been " stung " by the female, but in which the eggs fail to hatch.

In common with many species of Sawfly, *B. pusilla* exhibits the habit of periods of scarcity suddenly broken by a period of extremely high abundance. ROEBUCK (2) reported the presence of this pest in 1931 throughout the Midland Province when the number of individuals was enormous, whereas very low populations occurred during the years 1922–30 and 1932–35.

Host Plants.—Blennocampa pusilla attacks both the wild Rose, *Rosa canina*, and cultivated Roses. Preference is shown for certain varieties of Bush and Climbing Roses, while Standard Roses, though of the same susceptible variety as those grown as Bush, are far less attractive to the females.

Severe attacks often occur on " suckers " where the wild Rose is used as the stock, and as such form a focal point of attack in a neglected rosery.

Susceptibility of Varieties to Attack.—The factor that appears to be chiefly concerned with resistance to attack is physical, namely, the thickness and nature of the leaf cuticle. Varieties that possess thick and shiny leaves are not favoured by the females for egg-laying.

Certain striking varietal preferences exhibited by this pest have been observed; for instance, in a mixed bed of HTs., comprising the varieties 'Chas. P. Kilham' and 'McGredy's Yellow,' the former was not attacked while the leaves of the latter were completely crippled by the pest.

The following list of varieties, though by no means complete, indicates the degree of attack by this Sawfly, and refers to a number of observations taken over many years and from widely separated districts:

Baroness Rothschild	HP ++
Betty Uprichard	HT ++
Blush Rambler	P +
Bouquet d'Or	Cl.T +
Capt. Christy	HP +
Capt. Hayward	HP ++
Cheshunt Hybrid	HT +
Christine	HT +
Clara Watson	HT +
Félicité Perpétue	S +
Frau Karl Druschki	HP +
Joanna Bridge	HT +++
Lady Waterlow	Cl.HT ++
Maréchal Niel	Cl.N +
Marchioness of Londonderry	HP +
Margaret Dickson	HP +
Marie van Houtte	T +
McGredy's Yellow	HT +++
Mme. A Carrière	Cl N +
Mme. Pernet-Ducher	HT +
Mrs. John Laing	HP +++
Mrs Paul	B +
Mrs. R. G. Sharman Crawford	HP +
Paul's Carmine Pillar	Cl.HT +
Paul Neyron	HP +
Reine Olga de Wurtenburg	Cl HT +
Shot Silk	HT +
Suzanne-Marie Rodocanachi	HP +
Tea Rambler	Cl.T +
Una	Cl.HT +
William Allen Richardson	Cl N +
Zepherin Drouhin	Cl.B +

(Degree of susceptibility:—Slightly +; Fairly ++; Very susceptible +++.)

Distribution.—This species is widely distributed throughout England, especially in the Home and Southern Counties, and occasional outbreaks occur in Scotland and Northern Ireland.

It is recorded throughout Europe, including Austria, Czecho-Slovakia, Denmark, France, Germany, Holland, Hungary, Russia, Sweden and Switzerland.

Life Cycle and Habits.—The black, shiny Sawflies, which somewhat resemble "flying Ants" to the untrained eye, appear in May and early June. They are about $\frac{1}{6}$th inch in length, and possess two pairs of dusky, slightly iridescent wings. The legs are black with the "knees," tibiæ and tarsi yellowish-white.

The female, after pairing, straddles the leaf margin of the unfolding leaflet (Fig. 1), and inserts an egg in the marginal area within the leaf tissue with the aid of her saw-like ovipositor. The eggs, which are transparent green in colour, are clearly seen within the leaf tissue when the "stung" leaflet is held towards the light and examined with a hand-lens (Fig. 1).

The effect of egg-laying is that the leaflets upon opening roll downwards and inwards (Fig. 1 a)—this reaction following closely upon oviposition and before the eggs hatch. This type of leaf-roll is *not* due to the action of the larva, and bears no resemblance to that produced

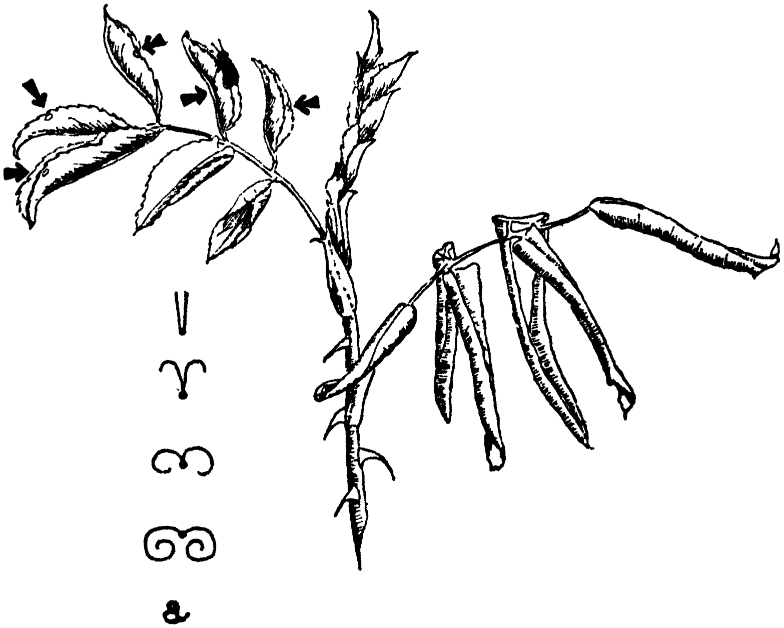

FIG. 1.—LEAF-ROLLING ROSE SAWFLY OVIPOSITING IN UNFOLDED LEAFLETS, AND EGGS *in situ* IN MARGINAL AREA OF LEAVES.
(*a*) Development of lateral roll of leaflets following oviposition.

by the leaf-rolling caterpillars of Tortricid Moths, which tie the sides of the leaf together with the aid of silken threads from their spinnerets.

The larva is at first very pale green or whitish, becoming greener with paler areas between the segments, and with conspicuous, but short, hairs along the back of the body. It possesses three pairs of true (thoracic) legs, which are green and darker towards the tips, and six pairs of pro-legs or sucker-feet (abdominal appendages), which are paler in colour than the body. The head is white or brown, very shiny and bears a conspicuous eye-spot and dark jaws.

The larvæ feed on the leaf portions within the rolled foliage in which they find themselves after hatching from the eggs. One, very occasionally two, larva lives within each rolled leaflet, and may move from one leaf to another when the supply of food is exhausted. The effect upon the bush is that the vitality is lowered so that normal growth is checked.

The fully-fed larva attains a length of 8–9 mm., and descends to the ground in July or August. It remains within a fragile cocoon covered with soil particles a few inches below ground level until February, March or early April, when it pupates. The 4-winged adults appear during bright sunny days in May when they are seen flying around and above Rose bushes and climbers, occasionally settling on the foliage where pairing takes place. Despite the activity of the Sawflies on the wing, they do not appear to travel far from the site from which they have emerged from their cocoons, and lateral spread of attack from a focal point is slow even in a rosery where numerous food plants are present within a short range of the initial outbreak.

Control Measures.—The fact that this pest may be present as larval cocoons in the soil adhering to the roots of transplanted bushes and climbers makes it advisable to wash thoroughly the roots clear of soil prior to planting in their fresh site. Bushes received from outside sources are a potential danger in this respect.

In the case of light attacks, it is desirable to remove and burn all rolled leaves as soon as they are observed in May and early June. Delay in completing this operation is unwise bearing in mind that leaf-roll occurs soon after egg-laying and before the eggs hatch. It is advisable, therefore, to remove and destroy the infested leaves before the larvæ appear and extend the initial injury. In several roseries it has been possible to eradicate this pest completely in two seasons by timely removal of the rolled leaves during the period mid-May to early June.

The general recommendations against this pest are to apply either an arsenical (Lead arsenate) or a contact Nicotine-Soap wash. Neither method is effective, for not only is it impossible to provide a cover wash of poisonous particles on those portions of the leaves that are already rolled inwards and which are devoured by the larvæ, but also to make contact with the larvæ ensconced within the tubular portions of the infested foliage.

The application of a Nicotine dust (3–4 per cent. Nicotine) at air temperatures above 65° F. is partially effective against the larvæ within the rolled leaflets, but should not be applied until after the eggs hatch. The presence of the inert carrier alone, with which the Nicotine is mixed and from which it speedily volatilises at high temperatures, serves no useful repellent action against the egg-laying female Sawflies.

The result of two years' investigations at Wisley with D.D.T. formulations against this pest indicate that an effective control is possible by *timely* applications of a 0·1–0·2 per cent. emulsion, which kills the adult Sawflies hovering over and settling upon the foliage and thus prevents oviposition. The application of a 5 per cent. D.D.T. dust not only kills those sawflies that are dusted and those that alight on the dusted foliage, but also has a repellent effect in preventing oviposition. The females chose the unfolded leaflets upon which to lay their eggs in the marginal areas (Fig. 1), and two applications of the dust with an interval of 7-10 days between the dustings are necessary to provide a repellent cover to the leaflets that have developed since the first application. The date of application will vary according to the season, but it is advisable to be prepared for action by about mid-May and as soon as the Sawflies are seen flying about the plants.

Acknowledgement.—The author expresses his sincere thanks to his wife for the drawing illustrating this note.

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NOTES FROM FELLOWS

Arbutus Menziesii in its native habitat

THERE is a grove of this Arbutus on Bainbridge Island, in Puget Sound, about 300 yards long, and about 100 yards deep. There are a few Douglas Fir and *Cornus Nuttallii* among them, and a little underbrush, such as *Gaultheria Shallon* and *Mahonia Aquifolium.* They grow right down to the edge of salt water, on a low bank. They are about 40 to 50 feet high and must be quite old, as of course, they were there before the country was settled. I saw them in fruit in October 1940, and the whole front of the grove seemed to be a solid mass of dark orange, interspersed with the shiny dark green foliage.

They grow mostly on coarse gravel mixed with clay, with just the natural leaf mould. This soil is slightly acid, as Rhododendron will grow in it perfectly, in fact, *Rhododendron macrophyllum* (*californicum*) is also a native. The Madrona, as it is called, seems to grow at its best within a few miles of salt water, as back in the hills, ten miles or so from the Sound, there are practically none, or at most an odd one or so.

They are not much used as an ornamental plant here, except where a few have been left when clearing the land. They are hard to transplant, unless they are taken as small seedlings, with some of the soil they are growing in. I have handled them that way, and by transplanting every year in a nursery bed, they will gradually get a ball of roots, and so can then be moved in larger sizes. We have very rainy winters here, but the summers are dry, with very little rain from May until October. The trees themselves seem to be quite hardy, but if the temperature gets down around 15 degrees in the winter, the buds will freeze, with consequent loss of the fruit crops the following fall.

LESTER E. BRANDT.
Puyallup, Washington.

Following on the note by Mr. CHARLES ELEY in the January JOURNAL, I wish to add an amateur's confirmation of his experience in soil requirements. This plant is indigenous to this area, growing in great numbers. It seeds itself so rapidly that it becomes a nuisance in many cases.

His comment fits perfectly with the growing conditions here. The finest stands are usually found on poor, dry, well-drained soil and are much more prevalent on dry southern slopes than on damper northern ones. I have never seen a tree in rich damp soil although when once established they seem to withstand almost any condition.

It is one of our finest " natives " but perhaps the reason the fruit is not more widely admired is that it usually is high on the tree and therefore seen at its best only from some elevation or where the tree leans over a bank as it frequently does along the shoreline.

HERBERT G. IHRIG.
Seattle, Washington.

Arbutus Menziesii in its native habitat

With reference to Mr. CHARLES ELEY's statement regarding the soil requirements of the Madrona, I believe it likely that the tree is tolerant to a small margin of alkalinity in the soil, as I have seen it growing to lovely maturity in very slightly alkaline soils. At the same time, it is far more common to find it growing in amongst the red woods, where the acid condition of the decomposed needles extends to a depth of many feet. A most common associate is *Rhododendron occidentale* (T. & G.), which requires much the same soil as the other members of its genus.

His difficulties in growing the Madrona may well arise from excess of moisture, both in the soil and air, during the native dry season, from May until the first of November. Of course it amazed me that I found so many of our natives doing beautifully throughout southern England, and doubt that I ever saw anything lovelier than *Romneya Coulteri* as it bloomed in the Botanic Gardens at Bath.

JOSEPH W. STEPHENSON,
Hayward, overlooking San Francisco Bay, California

PLANTS TO WHICH AWARDS HAVE BEEN MADE IN 1946

Gentiana Vorna. **A.M.** September 10, 1946. Another handsome hybrid, between *G. Veitchiorum* and *G. ornata*, which received a Prelim. Comm. a year ago. The plant forms a wide open-centred rosette of flowering stems 4 to 5 inches long, each normally bearing one terminal flower; the foliage resembles that of *G. Veitchiorum*. Sepals linear, ¾-inch long, slightly spreading: corolla funnel-form, 1½ inches long, 1 to 1¼ inches wide across the mouth, slightly swollen at mid-length, striated outside, the lobes deep Prussian blue, tips reflexing. Raised and exhibited by W. L. Lead, Esq., 4, Park Lane, Hagfield, Stockport. (See vol. LXXI, p. lxxv.)

Rose 'Golden Crest.' **A.M.** June 18, 1946. This very beautiful and vigorous climbing Rose is the result of a cross between 'Easlea's Golden Rambler' and an unnamed seedling. In normal seasons it starts to bloom about the end of May. The flowers, which are not affected by rain, are of medium size and sweetly scented. Their colour is aureolin (H.C.C. 3/2) which becomes deeper at the base of the petals. Raised and shown by Mr. W. E. B. Archer & Daughter, Ltd., The Roseries, Monks Horton, Sellindge, Ashford, Kent. (See vol. LXXI, p. lviii.)

Rose 'R. S. Hudson.' **A.M.** October 22, 1946. A very attractive maize yellow variety of good shape with a slight pink flush on the outer petals. It is a strong grower and was raised and exhibited by Messrs. Wheatcroft Bros., Ltd., Ruddington, Nottingham. (See p. vii.)

Stachys grandiflora. **A.M.** June 18, 1946. A useful plant for the herbaceous border, forming a neat clump of long-stalked, ovate, dark green leaves, from which numerous erect stems arise to a height of 18 inches, bearing flowers arranged in close whorls of ten. The tubular, two-lipped flower is over an inch long, Imperial Purple (H.C.C. 33/1-2) in colour. Exhibited by the Director, Royal Botanic Gardens, Kew. (See vol. LXXI, p. lix.)

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JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

Vol. LXXII Part 5

May 1947

THE SECRETARY'S PAGE

Death of Lt.-Col. F. R. Durham.—We very much regret to announce that Lt.-Col. F. R. Durham, our late Secretary, died at Sidmouth on March 30th. He was Secretary of this Society from 1926 to 1946. A further notice will be published in a succeeding JOURNAL.

Chelsea Flower Show.—The Chelsea Flower Show will be held in the Royal Hospital grounds on Wednesday, Thursday and Friday, May 21, 22 and 23. The hours of opening for Fellows and the prices and hours of admission to the public are as follows :—

	Wednesday, May 21.
8 A.M. to 8 P.M.	Show open to Fellows, Associates and holders of Fellows' tickets.
1 P.M. to 8 P.M.	Public admitted—entrance 10*s*.
	Thursday, May 22.
8 A.M. to 8 P.M.	Show open to Fellows, Associates and holders of Fellows' tickets.
12 noon to 5 P.M.	Public admitted—entrance 5*s*.
5 P.M. to 8 P.M.	Public admitted—entrance 2*s*. 6*d*.
	Friday, May 23.
8 A.M. to 5 P.M.	Show open to Fellows, Associates and holders of Fellows' tickets.
8 A.M. to 5. P.M.	Public admitted—entrance 2*s*. 6*d*.

A circular has been prepared, and may be obtained on application to the Secretary, giving the official traffic arrangements, together with a map showing the parking places and the entrances to and exits from the Show grounds. These arrangements will be substantially the same as those in force at the 1939 Show.

Fellows and Associates are also asked to note that self-propelled and invalid chairs cannot be admitted on Wednesday, May 21. On Thursday and Friday, May 22 and 23, they will be admitted between the opening hour and 12 noon. It will add greatly to the comfort of those using the invalid chairs as well as others visiting the Show if these regulations are carefully noted.

There is every prospect, provided the weather is kind, of Chelsea Show proving, as it has always done, a great attraction to horticulturists, and Fellows are, therefore, reminded that the least crowded hours are the early and the late.

Meetings in June.—The following Meetings and Shows will take place during the month of June :—

Tuesday, June 3—12 noon to 6 P.M.
Wednesday, June 4—10 A.M. to 5 P.M.
Tuesday, June 17—12 noon to 6 P.M.
Wednesday, June 18—10 A.M. to 5 P.M.

In connection with the latter Show there will be a Flowering Tree and Shrub Competition, schedules for which may be obtained from the Secretary. In conjunction with this Show the National Carnation and Picotee Society will be holding a Pink Competition.

Lectures.—On Tuesday, June 3, at 3 P.M. in the Lecture Room of the New Hall, Dr. T. Swarbrick will deliver the first of the two annual Masters Memorial Lectures, taking as his subject "Plant Hormones and their Relation to Horticulture." On Tuesday, June 17, and also at 3 P.M., Mr. M. Haworth-Booth will lecture on "Choice Shrubs" in the Lecture Room.

Demonstrations at Wisley.—The following demonstrations will take place at Wisley during May and June :—

Vegetable Garden

Wednesday and Thursday, May 14 and 15.—Thinning, transplanting and successional cropping (2–4 P.M.).

Flower Garden

Wednesday and Thursday, June 4 and 5.—Summer pruning of shrubs (2–4 P.M.).

The demonstration to be given on the second day is in each case a repetition of that given on the first.

Admission to Wisley.—Attention is drawn to the announcement made by the President at the Annual General Meeting to the effect that Fellows' and Associates' tickets now each admit four persons to the Gardens at Wisley on all days when the Gardens are open to Fellows.

How to get to Wisley.—Fellows and Associates desiring to travel to Wisley from London are reminded that the easiest method is to take the Green Line coach, No. 715, which passes through Oxford Circus at 7, 27 and 47 minutes past the hour *en route* for Guildford. The actual bus stop is not in Oxford Circus, but in Upper Regent Street, opposite the Polytechnic. One should book to the Society's Gardens and ask to be put down at the turning on the Portsmouth Road leading to them. The Gardens are about five minutes' walk from that point. Alternatively, one can travel from Waterloo to Kingston and then by the Guildford bus, No. 215, which leaves the bus station about one minute's walk from Kingston railway station. For particulars regarding the buses, enquiries should be made at the London Passenger Transport Board, 55 Broadway, London, S.W. 1 (Tel. ABBey 1234), and for the times of trains from Waterloo, the current time-table should be consulted or enquiries made at Waterloo Station (Tel. WATerloo 5100).

Colorado Beetle.—We have been asked to draw the attention of Fellows to the fact that the Colorado Beetle has been found recently in importations of Lettuces and other vegetables. The Colorado Beetle is yellowish with black stripes running up and down the beetle and not across. It is requested that any specimens found should be reported immediately to Ministry of Agriculture, Plant Pathology Laboratory, 28 Milton Road, Harpenden, Herts.

WISLEY IN MAY

THE month will bring the floral display in the Gardens to its highest peak, and provided no hard frosts occur to add to the damage already caused by the winter, every day will see an increase in the number of plants in flower.

For those who can make only a short visit, the Rhododendrons, both hybrids and species, on Battleston Hill, with the Rock Garden and Alpine House, and the adjoining Wild Garden will be focal points of interest. If more time is available, the Lilacs and Rose species in Howard's Field, and the Pinetum, are well worth inspection.

The main items of the display are Rhododendrons, Magnolias, Lilacs, Berberis, and rock plants, and to detail all by name would require a larger JOURNAL.

Round the Laboratory walls will be found many plants of interest. *Ceanothus rigidus* with bright blue flowers is almost our sole survivor among the evergreens of this family, while the Tree Paeonies planted on the south side will also be coming into flower uninjured by the severe winter, but liable to damage by the late spring fronsts. On the east wall several varieties of *Camellia japonica* and the self-clinging climber *Hydrangea petiolaris* will also be in flower.

Battleston Hill will have a great number of new Rhododendrons in bloom, with the Magnolias and Camellias noted last month. The fine collection of hybrids planted in 1938 has now become well established and flowers freely every year. A few of the most striking are ' Borde Hill ' (blood red), ' Mrs. Furnival ' and ' Marinus Koster ' (rose pink blotched with scarlet), ' White Swan ' with solid trusses of large bloom, and ' Blue Peter ' (rosy lavender).

The new collection of species can hardly be expected to give of their best the first year after planting, but amongst the established kinds *R. Augustinii* with nearly blue flowers, and several fine specimens of the pink and white forms of *R. arboreum* will be found in flower, while many species of interest will be found amongst the new plantings. A large trial of deciduous Azaleas of the ' mollis ' and ' Ghent ' types has also been planted, and they will be flowering later in the month.

The avenue of Cherries near the Rose collection will still be in bloom, and these will be joined by the flowering Crabs, beautiful both in flower and fruit, particularly *Malus Eleyi, M. Lemoinei* and the double-flowered *M. magdeburgensis.* Flowering in advance of the Crabs is the richly coloured double Peach *Prunus persica* var. *magnifica,* a shrub even the smallest garden could accommodate.

The Alpine House will be gay with many-flowered pans. Among the choicer plants will be the lavender flowered *Daphne Genkwa,* and the tiny hummocks of *D. rupestris* var. *grandiflora* almost covered with large, rose pink flowers, while many of the Lewisias mentioned last month will still be in flower, with new arrivals in *Polygala Vayredae* and *Erinacea Anthyllis* with soft lavender, broom-like flowers protected by formidable spikes.

The Rock Garden will be at its best this month, with many patches of colour, formed both by the popular hybrids of Aubretia, Saxifrages, and Phlox, and the choicer species of Primula and Gentian, while in crevices shaded from the sun will be *Ramondia Nathaliae* and *Haberlea Ferdinandi-Coburgi* with lilac-mauve flowers above an evergreen rosette. Many small shrubs will also be flowering here, including the delightfully fragrant *Daphne Cneorum,* and *Lithospermum diffusum* (*prostratum*) in its two varieties, ' Heavenly Blue ' and ' Grace Ward,' while a good specimen of the hybrid *Deutzia rosea* will be found on a mound near the Bog Garden.

Crossing the path and entering the Wild Garden visitors will note in addition to the many Camellias and Rhododendrons, large shrubs of *Magnolia Wilsonii* and *M. Lennei,* one of the best hybrids, producing a succession of large purple, goblet-shaped flowers. Many species and varieties of Enkianthus thrive in the peaty soil, and produce a profusion of pendulous racemes of white, cream or rosy bells, while other good shrubs are *Styrax japonicus* and *Cornus florida* var. *rubra,* a most arresting plant when in full flower. The many beds of Candelabra Primulas have been increased and restocked, and these, with the various Trilliums, Bluebells, and Welsh poppies, always provide a great display. Towards the end of the month the Blue Poppy, *Meconopsis betonicifolia* (*Baileyi*) will also be flowering here.

On leaving the Wild Garden, the older planting of hybrid Azaleas near the Award of Garden Merit Collection will be found in full bloom during this month. Many flowering shrubs will be found in Seven Acres, together with the flowering Cherries. One of the most striking is *Malus hupehensis* (*theifera*), producing its large fragrant flowers when most of the other Crabs are over.

A number of Berberis produce their yellow often fragrant flowers in May; *B. Vernae, B. koreana,* and the many forms of the evergreen hybrid *B. stenophylla* are some of the best. The white racemes of the Exochordas are also conspicuous, and the many forms and varieties of Spiraea and Lonicera are all worth seeing at the present time.

The Heath Garden will have no fresh Ericas in flower this month, but *Erica aborea* var. *alpina* will still be in flower and the display will be strengthened by the flowering of the many hybrid Brooms and species of Gorse, which associate so well with this type of planting.

Passing through the Pinetum we reach Howard's Field and the collection of hybrid Lilacs. Over a hundred varieties are represented here, and in spite of this being one of the sandiest and poorest parts of the garden they flower and grow freely. Varieties that give an outstanding performance include ' Kathleen Havemeyer ' (double, pale lavender), ' Macrostachya ' (clear blush pink), and ' Marechal Foch ' (large-flowered rose pink).

Near the Lilacs will be found many beds of Rose species now beginning to open their flowers, particularly those of the *Rosa spinosissima* group, the ' Burnett or Scotch Roses,' with small white or yellow flowers, followed by black fruits. Others include *R. Primula* and *R. Hugonis* with long arching sprays wreathed with primrose-yellow blossoms.

Two other collections will be flowering this month: the collection of herbaceous Lupins on the trial grounds, with their glorious patchwork effect when in full flower and nearer Battleston Hill the border, planted with the many named varieties of Cytisus. These shrubs thrive extremely well at Wisley, and flower freely every year in spite of the damage the branches sometimes suffer from snow and wind. Pleasing members of the collection include *C. Burkwoodii* (crimson), ' Cornish Cream ' (white and cream), and the older rose-pink hybrid × *C. Dallimorei.*

PLANT COLLECTING IN SOUTH-EASTERN TIBET

By George Taylor, D.Sc.

PART II

WE had arranged to meet SHERRIFF on July 31 and four marches along the Tsangpo brought us to our rendezvous at Tse where our companion arrived shortly after we had pitched our tents. Six busy days were spent here, reading and disposing of our mail, developing films, comparing notes on our collections and looking them over preparatory to packing for the homeward journey. It was an exciting business opening our bundles and outbidding each other on the merits of our respective finds. We were pleasantly satisfied with our haul and had collected a wealth of material of botanical and horticultural interest. About 3,000 gatherings had been preserved and of most there was sufficient to allow generous distribution of duplicates. By way of celebration, and as a break from our scientific duties, SHERRIFF and I took a hand in the kitchen. We claimed the offal of a freshly killed sheep and, with the addition of suitable ingredients, concocted a most excellent haggis. The " chieftain o' the puddin' race " was served with all the honours (except bagpipes) and grudgingly voted a success by our epicurean Sassenach.

The peak of the flowering season was now over. Mulberries, Peaches and Walnuts were ripening and the grain-crops were being pulled or cut by golf-like swipes with a sickle attached to the end of a stick. Women were already flailing the grain to the accompaniment of monotonous chanting. In about a month to six weeks, we thought, it would be time to revisit our earlier collecting grounds to gather the seeds of marked plants. It was decided that, in the interval, LUDLOW would travel to the high plateau region on the Kham border while SHERRIFF and I explored the side valleys of the Nyang Chu, one of the largest tributaries of the Tsangpo.

On August 7, we crossed to the north side of the Tsangpo in coracles and camped below Tsela Dzong on the west bank of the Nyang Chu, shortly above its delta-like confluence with the Tsangpo. Tsela Dzong is an important administrative centre and two days were spent exchanging courtesy visits with local notables. We moved off on August 10 and parted with LUDLOW at Puchu whence our route deviated from the main valley and led to the rolling plateau in the neighbourhood of the Mira La.

A short distance from the Nyang Chu we entered thin forest but there was little of interest in the lower parts. As we ascended the rough stony path through the *Abies* and *Picea*, interesting plants began to appear. In a clearing amongst shrubs there was a fine group of *Notholirion hyacinthinum*, the plants up to four and a half feet high and bearing up to thirty rose-pink flowers. Grassy banks in the forest were covered at places with *Cyananthus lobatus* in beautiful flower. *Codonopsis mollis* was in plenty, perched on high narrow cliff ledges, its lovely soft mauve-purple tubular flowers seemed as if suspended in space. On damp rocks in the *Picea* forest we found a very attractive small, yellow-flowered species of *Meconopsis* which clearly was one of the *Primulinae*, having the radish-like rootstock which betokens difficulty in culture. The flowers (up to nine in number) were borne singly on basal or agglutinated scapes up to six inches in height and were up to an inch and a half in diameter while the pale, lemon-yellow petals were usually four but varied up to seven. At first sight the plant recalled the white-flowered *M. argemonantha* which I then knew only from habitat photographs and herbarium specimens, although the yellow petals suggested the possibility of identity with *M. Florindae*, which Kingdon-Ward had discovered on the Tra La some distance to the east. A few weeks later, on the Bimba La, I collected *M. argemonantha* in fruit and the resemblance to the Mira La plant was so striking that there could be no doubt of their very close relationship. The *Primulinae* comprise an assemblage of somewhat ill-defined species in which it is difficult to find stable criteria for separation and as more material becomes available some readjustment in the classification of series may be necessary. From examination of the herbarium material I find it impossible, apart from the difference in petal colour, to distinguish the small Mira La yellow-flowered Poppy from *M. argemonantha* and I have therefore decided to recognize it as a new variety of that species. *M. argemonantha* var. *lutea* * (Figs. 57 [April] and 75) is represented in our 1938 collection by six gatherings as follows: valley above Tse, leaf-rosettes only, 12,000 feet, June 1938, Ludlow, Sherriff and Taylor 4589; same locality, August 1938, L., S. & T. 4589a; Tum la, Nayu, 12,500 feet, July 1938, L., S. & T. 5790; Go Nyi Re, Paka Phu Chu, 14,000 feet, July 1938, L., S. & T. 5898; Mira La, Nyang Chu, 12,500 feet, August 1938, L., S. & T. 4589b; same locality, 14,000–15,000 feet. August 1938, L., S. & T. 6064. From *M. Florindae*, which has a leafy flowering stem, the new variety is distinguished by having the flowers borne on bristly basal scapes though these may sometimes be agglutinated. In *M. Florindae* the whole plant is glabrous or almost so, whereas in *M. argemonantha* var. *lutea*, though the leaves may sometimes be almost glabrous, the scape and ovary are more or less densely bristly. The capsule is usually quite densely covered with spreading or reflexed bristles.

Above the forest the late alpines were in profusion and we decided to camp at about 13,000 feet on a grazing flat by the stream. Close to the tents grew a magnificent thistle, *Cirsium eriophoroides* subsp. *bolocephalum*, about three feet high and forming massive colonies (Fig. 85). Its developing capitula were exceedingly beautiful with the spiny bracts protruding through a dense, snow-white, cobwebby felt, and the emergence of the reddish-purple florets beyond the ornamental involucre making a most striking effect. Surely no thistle could be more handsome. Seed was taken but there has been no report of its germination.

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* **Meconopsis argemonantha** var. **lutea** G. Tayl., var. nov. a typo (var **genuina** G. Tayl.) petalis citreis distincta Typus *F. Ludlow, G. Sherriff* and *G. Taylor* 5790 in Herb. Mus. Brit., ad Tum La, Nayu in Tibet austro-orientali anno 1938 lectus.

Most of the *Primula* species were past flowering but we collected a respectable number of specimens including the following: *P. bellidifolia, P. Baileyana, P. Littledalei* (Fig. 77), *P. sinoplantaginea, P. advena, P. crispata, P. amabilis* and *P. Youngeriana.* The last was a new species growing in dry moss under huge boulders in company with *P. Littledalei* and is a lovely plant with the under-surface of the flaccid leaves, like the scape, bracts and calyx-lobes, white-farinose. The corolla is usually deep blue-violet with a large white eye.

On the Mira La we added to the tally of *Meconopsis.* In June 1936, SHERRIFF discovered *M. horridula* var. *lutea* in very small quantity at 16,000 feet on the Shagam La in Tsari, about eighty miles to the south. Judge of our delight when we found abundance of the plant between 15,000 and 16,000 feet in block boulder scree on a very steep grassy hillside (Fig. 64 April). The specimens were up to three and a half feet in height with pale yellow-sulphur petals and were growing in association with the short-styled form of *M. integrifolia* which was in immature fruit and commonly had but one flower. Not far away, amongst dwarf Rhododendrons, was *M. simplicifolia* but we did not detect any × *M. Harleyana.* On grassy cliff ledges a few blue-violet flowers lingered on *M. impedita.*

The turfy hill-slopes were bright with hosts of Gentians which seemed to vie with each other in their lavish display. The variety of species on the Mira La was astonishing. Here, plants which were hailed with delight when introduced from S.W. China grew with those usually associated with the eastern Himalaya. In no other area visited was this mingling of the eastern and western floras so forcibly illustrated, but it was not, of course, confined to the Gentians. Blue was the predominant colour amongst the autumn-flowering alpines and the most vivid splashes of colour were provided by species of *Gentiana.* Several members of this lovely but critical genus await further study before being identified, but it may be of some interest to mention those from the Mira La which have been named so far. At 12,500 feet, on a damp grassy flat near the stream, *G. sikkimensis* spread over mossy hummocks. The corolla-tube was green and mottled with greenish-blue on the outside towards the top: the segments were slaty-blue with intervening white plicae. Close at hand, amongst *Salix* on a steep bank and on the open hillside, was *G. Przewalskii.* The corolla-tube and lobes were white and speckled with greenish-blue or flushed with blue-purple on the outside; the lobes were evenly spotted with greenish-blue on the inside and the plicae were white. In some plants the inflorescences were congested and only a few inches in height, but usually they were more open and up to a foot. *G. epiporphyra* with bright blue flowers formed rosettes on open meadows from 13,500 to 15,000 feet. A splendid form of *G. trichotoma,* over a foot high in places, grew amongst dwarf Rhododendrons and on open damp grassy meadows. Its corolla-tube and segments were blue with a tinge of green and the plicae were mauve. *G. tsarongensis* (Fig. 79), a neat and attractive little plant with miniature leaves along short prostrate branches, was growing on open grassy hill slopes. The corolla-tube is short, concealed by the green calyx, but the flowers expand as beautiful blue-violet stars. On the higher hillsides from 14,500 to 16,000 feet, in damp hollows amongst boulders, were mats of *G. Sherriffii.* (Fig. 83). The cobalt-blue flowers, for all the world like bubbles, are sessile and so restricted at the top that the mouth of the corolla is closed by the small white-margined lobes which conceal the white plicae. Even in full sunshine the flowers did not appear to open to any extent. *G. ornata* var. *dichroa* occurred very sparingly on the grassy slopes. Dense tufts of *G. infelix* grew in mossy situations and in damp grassy meadows. This is a small prostrate, tufted plant with slaty-blue lobes at the apex of the blue-veined white tube. One of the neatest and attractive Gentians in this valley was *G. filistyla.* From the miniature rosettes arise dark-blue trumpets an inch and a half in height and about half an inch in diameter. Another charming member of the *Gentianaceae* in the Mira La was *Lomatogonium oreocharis,* three to four inches in height, with blue-violet darkly-veined petals forming shallow cup-shaped flowers about an inch across. Sheets of this plant gave a gay touch to the steep rocky hillsides.

Rivalling the Gentians in their display were several species of *Cyananthus. C. incanus* formed tufts on grassy banks at 10,500 feet with each shoot bearing erect violet-blue flowers. Perhaps the most showy was *C. lobatus* which grew in profusion on open banks about 13,000 feet. This plant is familiar enough in cultivation but the effect of acres of turf stained with its deep blue-violet flowers could not easily be reproduced in gardens here. On the open hill slopes between 14,000 and 15,000 feet two species grew together. One, *C. spathulifolius,* had pale yellow flowers with the tube purple-veined. In the other, *C. macrocalyx,* the corolla-tube was greenish-white in the lower half, dark-purple above, and the lobes blue-violet. Close at hand, on a grassy meadow, we collected another campanulid of great charm and attractiveness, *Codonopsis nervosa,* whose the bell-shaped flowers, whitish-mauve with copious anastomosing blue-purple veins, nodded gracefully on slender stalks.

Some of the most beautiful high alpines, whose charm could scarcely fail to captivate the most fastidious gardener, belong to the Sino-Himalayan genus *Cremanthodium.* It is a great misfortune that they have so far proved intractable in cultivation. We had admired the occasional plants which we had seen previously, but on the Mira La they revealed their true glory. At 16,000 feet the loose granitic scree sparkled with myriads of the yellow heads of *C. humile.* It is a perfect little gem whose inch-wide heads forsake the usual nodding habit and become sub-erect. The flower-stems (one to four inches high) spring from a neat basal rosette of small leaves which are most attractively white-tomentose on the under-surface. Brown shaggy hairs clothe the stem and on the involucre and bracts form a soft woolly felt. Another plant of distinction, forming large colonies on open earthy screes, was *C. palmatum* subsp. *rhodocephalum* (Fig. 78), which appears to have its greatest concentration in Yunnan, whence it was described from FORREST'S collections. The dull crimson flower-scape emerges from a cluster of shallowy notched kidney-shaped leaves and bears a single drooping capitulum with broad showy ligules which are delicately suffused with pink. When fully developed the ray florets tend to lose the pink flush and become almost white. In 1936 my friends collected this species in Tsari and noted this variability in colour. From fruits which they gathered, plants were raised at Edinburgh which had white ligulate florets. On this account they were regarded as belonging to a new species and described under the name *C. Sherriffii* but the type-specimen is indistinguishable from that of *C. rhodocephalum* and the slight colour aberration is of no diagnostic value. We had previously collected the plant above Tripe, where it grew scattered sparsely on steep loose scree slopes, but on the Mira La it occurred in great profusion. A very elegant form of the yellow *C. plantagineum* adorned the open grassy hillsides between 14,500 and 15,000 feet. Up to fifteen inches in height, it had pendant heads with ligulate florets about an inch and a half long capped with the steel-grey woolly involucre.

Of the remaining alpines, *Saxifraga Diapensia*, a member of the *Hirculoideae*, deserves special mention. This plant, its dense tufts aglow with butter-yellow flowers, brightened many damp mossy pockets in the boulder scree at 16,000 feet. The petals are speckled with orange and the scape and margins of the sepals are embellished with purple-tipped glands. Unfortunately we were unable to return later for seeds of this lovely species.

We crossed the watershed on August 16 and descended into a tributary valley of the Nyang Chu which we reached at Chomo on the following day. On the rapid descent we collected some splendid Saxifrages, *Primula capitata*, *P. szechuanica*, *P. latisecta* and abundance of *Notholirion hyacinthinum*.

We rested a day at Chomo to deal with our collections and took the opportunity of visiting the local paper factory. We had seen a good deal of the tough Tibetan paper in use and indeed our passports were written in a beautiful hand on its rough surface. It was not possible to recognise the *Daphne* from which the paper was prepared. The bales of bark strips were said to come from the north but we could get no detailed description of the plant which must occur in some quantity to provide a continual supply of raw materials as the plants from which the bark is stripped have little chance of survival. The process of paper-making in the Tibetan fashion was as follows. A group of women pounded the *Daphne* strips with wooden mallets on smooth boulders and then scraped the soft tissue from the inner side of the lacerated bark into basins. After being boiled in water, the mash was poured into the same type of long cylindrical churn as is used in making the renowned Tibetan tea. By the piston-like action of a dolly, the *Daphne* was pulped to a fine suspension. Meanwhile wooden frames with fine stretched muslin had been placed in a shallow trough, about ten feet long and three feet wide, which was fed by a trickle of water led from a near-by stream. The fluid was then drawn from the churn in wooden ladles and poured as evenly and thinly as possible over the submerged muslin and smoothed out by hand. The frames were then raised gently from the water and placed in the sun to dry. In a day or two sheets of paper could be peeled from the frames.

We crossed the Nyang Chu on August 19 and marched up the eastern bank to Kyabden where we made camp. On the way we collected many interesting aquatic plants but none of any horticultural consequence. By an unkind stroke of fate, our stay at Kyabden was prolonged and our immediate plans entirely upset. For two or three days I had been much below par and had struggled along hoping that my griping pains would cease, but at Kyabden I was completely prostrated. I was unable to leave camp for a fortnight and it was galling to hold up the work of the expedition, but my companions would not agree to go on and allow me to catch up with them. SHERRIFF sent off runners to LUDLOW, then on the borders of Pome, and he returned post haste. There was no doubt about their alarm. My symptoms did not fit any of the ailments in our *vade mecum* and the nearest approach to a diagnosis was appendicitis. When the medicines dispensed stimulated too much in one direction, the process was reversed by pills of a different colour. At any rate the ministrations of my thoughtful and attentive friends certainly put me on my feet again. Their exertions to provide an adequate and agreeable diet—at one period three *Tibetan* chickens a day—were most praiseworthy. The table at my bedside was kept gay with seasonal flowers of which *Gentiana Waltonii* was probably the most spectacular, its magnificent sprays remaining fresh for many days in a glass of water. It was a great relief to be away from Kyabden and to be able to forage for plants once more.

We did short marches to the Tsangpo Valley and, after a halt at Dzeng, we were ready to cope with the seed harvest. On dry gravel terraces old-established plants of *Gentiana Waltonii* carried a profusion of blossom. The corolla-tube was pale purplish to chocolate outside, streaked with purple within. The plicae were bright pale-blue and the segments dark-blue outside, bright-blue within. It is a lovely plant when growing to perfection and should become a favourite in home gardens.

Codonopsis vinciflora (Fig. 81) festooned shrubs and small herbs and its lovely violet-blue flowers gave a glorious display. This species, with *C. convolvulacea*, is somewhat isolated from the other members of the genus. It is a true twiner with deeply lobed rotate corolla and the flowers are not pendulous and lack the putrid scent of its relatives. The perennating organ is a small tuber buried deep in the poor sunbaked stony soil, often in the midst of *Berberis* and Rose thickets. Digging the tubers in such situations was not a congenial job, but as many survived and have become established in some gardens the efforts were amply rewarded.

SHERRIFF set off to his early collecting grounds on September 16, while LUDLOW and I drifted down the Tsangpo in *kowas* to Lusha, which we made our base for a week of hurried expeditions to the passes visited in June and July to collect the autumn flowers and seeds of those plants which we had marked as desirable for cultivation at home.

Seed collecting can be an exasperating business and, in spite of careful planning, often ends in disappointment. Many plants, conspicuous enough during their flowering season, are not easily recognisable in fruit when the character of the surrounding vegetation has completely changed and the markers have become obscured. The plants may have failed to produce seed or it may still be immature; or it may have been shed, or devoured by grubs (*Meconopsis* seemed very prone to such attacks), or the plants may be deep in snow. Obstacles to travel are common. Fallen trees, landslides and broken bridges over unfordable rivers are all possible legacies from the monsoon, and we had experience of each. So when the gardener feels dissatisfied with a meagre portion of seed let him give a thought to the difficulties and hazards attending its collection. Occasionally, with species notoriously difficult to raise from seed, it may be desirable to lift live plants; but the trouble of transport, the worry of keeping them alive during a plateau crossing and through the steamy tropical valleys before reaching India, combined with the expense of sending them home by air, confines this treatment to exceptionally interesting species. Plants dealt with in this way included several species of petiolarid and nivalid Primulas, *Diapensia* species, *Berneuxia thibetica*, *Diplarche multiflora*, *Streptopus simplex* and a species of *Cypripedium*. Some of these survived the journey but most did not respond to the care and attention lavished on them at Edinburgh and have, I believe, now died.

The weather on the passes was just as detestable as that which we experienced earlier in the year but, nevertheless, we reaped a rich harvest of seeds and garnered several plants not seen on our previous visits. Time was now pressing and we had to prepare for our long journey back to India. We left Lusha on September 23 and, following the Tsangpo, reached Lilung on October 1. The destruction of a bridge over the Lilung Chu, half-way to Molo, where we had deposited our winter clothing and some of our collections, necessitated a wide detour to reach Kyimdong Dzong. We sent our dependable head servant with a party of porters to collect our baggage at Molo. On their return we lost no time in leaving Kyimdong Dzong and on October 12 we travelled up a dry narrow valley through scrub of *Cotoneaster*, *Spiraea*, *Caragana*, *Artemisia*, *Leptodermis*, *Rhamnus*, *Buddleja*, *Ceratostigma* and *Euonymus* and camped at Sumbatse on a pleasant green plain by the river. Next day we climbed steadily through terraced fields to the open uplands where the glory of the autumn colours left us entranced. Two kinds of *Berberis*—*B. Jaeschkeana* var. *bimbilaica* and, very appropriately, *B. Ludlowii*—varied through all shades of bronze-red to flaming scarlet. Blending beautifully were clumps of a Rose with yellow-bronze foliage. It was not a niggardly display; for miles the south-facing slopes were ablaze with brilliant colour.

Next day we crossed the Bimbi La and so left the Tsangpo drainage system. Near the summit we collected *Primula Caveana* on dry rock ledges, *P. dryadifolia*, *Gentiana Przewalskii* in dampish places on slaty scree, *G. sino-ornata* with its white variety, *G. tubiflora*, *G. Wardii*, *Lomatogonium oreocharis*, *Swertia multicaulis*, and the prostrate *Diplarche pauciflora* on mossy scree. The slopes below the pass were brilliantly coloured by *Berberis Jaeschkeana* var. *bimbilaica* and *B. Ludlowii*. On the grassy hillsides, some way down, there was abundance of *Cyananthus Sherriffii* in fruit but with next year's hairy shoots peering through broad investing scale leaves, *Cassiope fastigiata*, and *Primula glabra*. Mossy banks under Rhododendrons were covered with *P. Whitei* (See *Quart. Bull. Alp. Gard. Soc.* viii, 111 (1940)) mixed with *C. selaginoides*. On mossy scree slopes we collected fruiting material and seeds of *Diapensia Wardii* and *Diplarche pauciflora* but no report has been received of germination.

We camped in a narrow defile where the huge crags and scree slopes on either hand were garnished with choice plants. At this season, of course, few flowers were to be seen, yet there was abundant evidence of the floral wealth. In 1936 LUDLOW and SHERRIFF had thoroughly botanized the Bimbi La and, under their guidance, I was directed to several of the more interesting plants. I was specially pleased to see two *Meconopsis* new to me in their natural surroundings—*M. argemonantha* var. *genuina* and *M. bella*. Both were fruiting on grassy ledges of the crags. For many years *M. argemonantha*, described from two detached flowers and two leaves, remained a species of uncertain affinity until KINGDON-WARD in 1935 and SHERRIFF in 1936 rediscovered the species in Tsari and from their material it was possible to assign the plant to the *Primulinae*.

At Podzo Sumdo, where *Meconopsis paniculata* grew in profusion amongst *Rhododendron cinnabarinum* and *R. lepidotum*, we turned up the great Tsari Valley. We had entered the holy district of Tsari where the few inhabitants depend on the generosity of passing pilgrims for their subsistence. No cultivation is allowed and no animals may be killed. The valley must be one of the most lovely in Tibet and strongly reminded me of some parts of the upper Dee valley. Both sides were densely wooded and the district was obviously in the wet zone. LUDLOW has described Tsari as a paradise of flowers and the results of the 1936 expedition certainly confirm this view. Even now, in mid-October, there was plenty to interest the botanist. Gentians were most conspicuous and the meadows were adorned by thousands of their showy flowers. *Gentiana epiporphyra*, *G. Veitchiorum* (Fig. 82) and *G. sino-ornata* were the commonest species in the open, but *G. sikkimensis* and *G. gilvostriata* made brave splashes of colour under Rhododendrons. We had an exquisite camp site at Chickchar on a broad meadow which, in season, must have been a wonderful sight with hordes of Primulas. Above to the south, towered the majestic peak of Takpa Shiri with hanging glaciers scoring its upper flanks. Wisps of cloud trailed across its face and the scene was one of superb grandeur (Fig. 72).

On October 16, a cold wet day, we continued our march up the Tsari Chu to Chosam with no very appreciable ascent. Around Chosam we collected *Berberis tsarica*, a shrub of three feet with blood-red leaves, and the tantalisingly lovely *Gentiana rhodandra*. This annual

Gentian, at most two inches high, bedecked dry turfy banks with its myriads of flowers. The corolla-lobes and plicae were of the purest sky-blue and opened flat out to display the cinnamon anthers.

Near the head of the Tsari Chu we turned sharply to the south to cross the Cha La. A short distance below the summit, on a wet flush at about 16,000 feet, we gathered *Gentiana amplicrater*, a plant strongly resembling *G. depressa*, which seems likely to become established in this country. On the loose screes of the pass we found *G. amoena* forma *pallida*. It is not only the pale colour which distinguishes this plant from typical *G. amoena* and a summation of the differences suggests that some amendment to the status of *G. amoena* forma *pallida* may be required. From our observations, which are confirmed by the field notes of other collectors, the two plants show a strong ecological divergence. *G. amoena* forma *pallida* is confined to the loose dry screes of the plateau. Its dry membranous, almost papery, corolla-tube, shorter than in typical *G. amoena*, is inflated at the base and contracted towards the top. On the outside the corolla-tube is irregularly streaked with reddish-purple. The segments are slaty-blue with a white median line and the plicae are white, broadly deltoid and commonly entire. Typical *G. amoena*, on the other hand, is a plant of the main range and is found in damp situations, usually on the southern face. The brownish-purple corolla tube is more or less straight throughout its length. The segments are evenly blue-violet, while the intervening plicae are pale blue and usually deeply notched or at least fimbriate at the apex. It should be observed, however, that MARQUAND (in *Journ. Linn. Soc. Bot.* xlviii, 204 (1929)) states that the pale form (which he based on a KINGDON-WARD specimen collected on slaty screes on the plateau at Atsa) was collected with the type by the 1921 Mount Everest Expedition.

Other plants noted on the steep scree slopes of the pass were *Delphinium Beesianum* with deep blue-violet flowers, *Meconopsis horridula* and *Phlomis rotata*. The vegetation of the Cha La was typical of the Tibetan plateau and the stony hillsides were rather bare. In the neighbourhood we saw several herds of burrhel and a few gazelle, another indication of plateau conditions.

On the south side of the pass wide screes flanked the valley leading to the Char Chu and the landscape was rather drab and dreary. Leaving the alpine plateau we entered the transitional zone indicated by such plants as *Thermopsis barbata, Primula Jaffreyana, Gentiana Waltonii, Incarvillea lutea, Dracocephalum Hemsleyanum, Stellera Chamaejasme* and *Picea likiangensis*. On October 18 we reached the important monastic centre of Sanga Chöling. The flat ground by the river was occupied by a large monastery and immediately above another magnificent *gonpa* straddled a steep narrow ridge. Viewed from the slopes above the south bank of the Char Chu, the prospect of the white-washed and painted buildings of Sanga Chöling was very impressive. We camped on a pleasantly wooded lawn within the lower monastery and rested for some days in preparation for the rapid marches to follow if I was to reach India in time to take my passage home.

We followed the dry Char Chu Valley to Charme (where *Paeonia lutea* was fruiting on dry gravel-terraces) and there turned abruptly to the west to ascend to the Le La. A species of *Cotoneaster* dominated the south-facing slopes in the lower part of the valley and further up we passed into mixed scrub. On the other (north-facing) side of the valley, there was abundance of Juniper which gave way, as we ascended, to dense mixed forest of *Abies*, *Larix* and *Picea*. *Gentiana Waltonii* was abundant with *Primula Jaffreyana* (Fig. 76) on the dry slopes.

To the south above the forest, we gazed longingly at the snow-covered nick in the mountains—the Drichung La—the only known locality for *Meconopsis Sherriffii*, and debated whether we should add yet another species to our bag. The temptation to see such a rare plant, though past flowering, was too much for us and specimens were collected from the black, peaty, moss-covered soil-pockets in the boulder scree at 17,000 feet. It is well nigh impossible to reproduce such high altitude conditions in this country with the snow-shroud which covers the plants for weeks on end. Possibly this fine species still lingers in a few gardens, but it is hardly likely to become generally established. The coloured plate (Fig. 65 April), from a photograph by SHERRIFF, shows the plant on the Drichung La.

In a small gorge below the Le La, on grassy rock-ledges and banks usually in the shade of overhanging cliffs, *Meconopsis bella* was collected in fruit. At 17,000 feet, on loose, dusty, slaty scree, *Gentiana amoena* forma *pallida* and *G. amplicrater* were flowering and the watery-blue papery flowers of *Delphinium viscosum* rustled in the wind. We dropped down to the valley of the Loro Chu and arrived at Chayul Dzong on October 24. This march was a tragic one for LUDLOW. A mule carrying two boxes with clutches of precious eggs collided with an awkward tree at the side of the narrow track. The girth straps snapped under the strain and the boxes went careering down the steep hillside. Helplessly we watched them bouncing over the rocks until they came to rest. In these few minutes, weeks of patient work had been written off and only fragments of shells remained of the unique collection so much desired by the British Museum. This incident recalls a similar one, fortunately with a happier sequel, which occurred as we were crossing the Lilung Chu by a narrow swaying bridge. One of the mules carrying two boxes full of plant specimens knocked against one of the wooden stanchions. The carrier thongs broke and the boxes fell. As if by a miracle they trembled on either side of the bridge and came to rest overhanging the swirling waters of the river. A mere fraction of an inch had saved them from being swept away to the Tsangpo. The mule, meanwhile, pursued its placid, unburdened course while LUDLOW and I endured palpitations.

The Loro Chu drained a very dry valley with enormous gravel terraces from which a fierce wind whipped up quantities of stinging grit to add pungency to our journey. The river was quite a diminutive stream for such a broad valley. *Primula tibetica* was still in flower on damp flats by the river but the dominant plant there was *Iris lactea*—mostly in mature fruit but showing a few out-of-season flowers with pale-blue standards and greenish-yellow falls copiously pencilled with violet-blue. On the gravel beds were old trees of *Hippophae rhamnoides.* Bushes of a new *Berberis* species (*B. xanthoplaea*) were in flower on the dry terraces in company with *Ceratostigma Griffithii.*

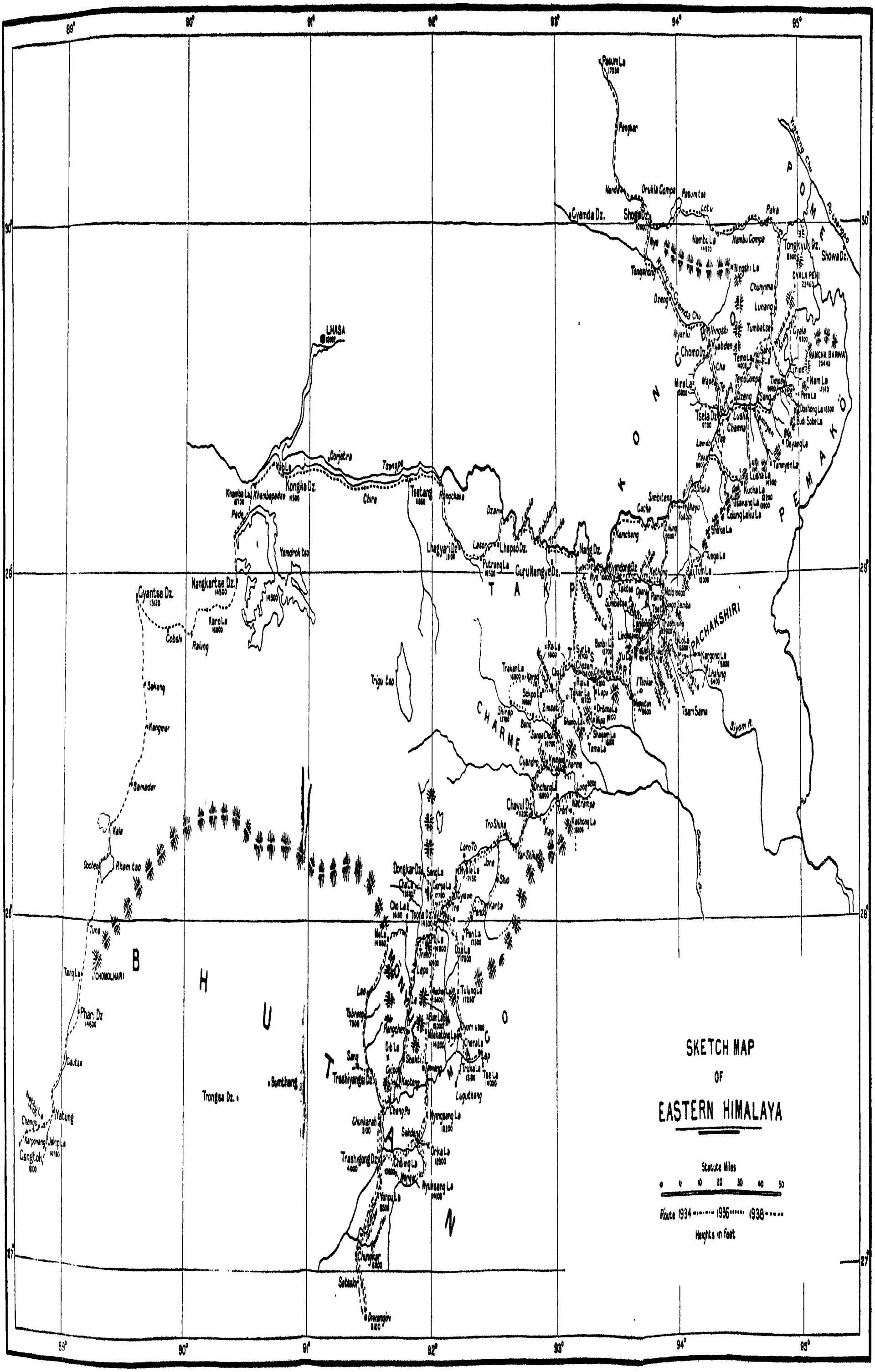
In four marches, in bitterly cold weather, we reached the Nyala La and hurried down to camp at Tre. We arrived with our eyes and mouths iced up and with icicles hanging from our noses. On the pass at 17,000 feet we saw kyang (*Equus hemionus*, a species of wild ass), gazelle, *Ovis ammon* (giant wild sheep) and burrhel. The late October days on the plateau were exhilarating. The sun shone from a cloudless sky and only the penetrating wind caused much discomfort. Once the sun was set the evenings were crisp with hard frost. Meals had to be eaten speedily if the fat was not to congeal in the dish. At night our breath froze as hoar frost on our blankets and water in a glass at one's bedside quickly turned to ice. The Gentians seemed to enjoy the cold! In the early morning they sparkled with ice crystals but later opened their flowers to the sun as it climbed in the heavens.

We reached the Pö La on October 30 and from the edge of the plateau we looked into the densely wooded valley of the Nyam Jang Chu. The contrast was astonishing and in a few miles we passed into an entirely different biotype. Without regret we left the roof of the world and plunged down the sheltered slopes of the Nyam Jang Chu. On the west side of the Pö La, *Meconopsis bella* and *Primula hyacinthina* were in fruit and here, too, we collected typical *Gentiana amoena* (on grassy rocks and damp mossy banks by the stream) with corolla-tube browny-purple on the outside and spotted with blue-purple within. The corolla-lobes were blue-violet and the plicae very pale blue. At about 12,500 feet, in *Berberis* and *Salix* thickets, *Meconopsis grandis* and *M. simplicifolia* grew together. Both were fruiting but *M. grandis* was showing the offsets for the next year while the plants of *M. simplicifolia* were withered and dead.

Around Trimo, where we camped at 9,800 feet, we revelled in the rich vegetation after weeks of travel on the inhospitable plateau. *Pinus Wallichiana, Tsuga dumosa,* and *Larix Griffithiana* were the dominant trees, but there was a wealth of interesting shrubs including *Rhododendron Wallichii* and species of *Berberis, Buxus, Cotoneaster, Sorbus, Ilex, Hedera, Buddleja, Enkianthus, Vaccinium, Colquhounia, Daphne, Elaeagnus, Litsea* and *Juniperus. Gentiana speciosa* with pale washy-blue flowers scrambled over *Vaccinium* bushes.

Below Trimo the valley descends rapidly and the vegetation becomes subtropical. The Nyam Jang Chu drains the Mönyul district of Tibet and flows through East Bhutan as the Manaas River to the plains of India. In spite of the late season and rapid marches we had full presses each day until we reached railhead at Diwangiri on November 14. Thus ended a memorable and highly interesting journey.

When I reflect on our months of travel, the overwhelming numbers of beautiful plants seen, the sustained excitement of plant-hunting from day to day, the thrills in ascending to unexplored passes, the wonderful prospects of mountain and valley, I am only too conscious



The Plant Collecting Journeys in South-Eastern Tibet of Ludlow, Sherriff and Taylor in 1934, 1936 and 1938 (Opposite p. 176)

that my sketchy account is sadly deficient. Many good plants found during the expedition have not been mentioned (a large number await identification) but it is hoped that all will be enumerated eventually. Those of sufficient interest to horticulturists, and of which photographs are available, may be subjects of later published notes.

It is impossible for me to express adequately my deep gratitude to my friends LUDLOW and SHERRIFF for much personal kindness and for their unsparing efforts to ensure the comfort and success of the expedition. Access to Tibet is notoriously difficult and travel in the country is not for the neophyte without knowledge of its language and strange customs. With the unrivalled experience of my companions these difficulties vanished and I was left entirely free to devote my time to collecting. I am also under very great obligation to my colleague, Dr. J. RAMSBOTTOM, Keeper of Botany at the British Museum, for his kind encouragement and keen interest: on his recommendation the Trustees of the British Museum allowed me to join the expedition.

TRESCO UNDER THREE REIGNS

By Rt. Rev. J. W. Hunkin, D.D., Bishop of Truro

PART I.—AUGUSTUS SMITH, M.P., LORD PROPRIETOR OF THE ISLES OF SCILLY, 1834–1872; AND THOMAS ALGERNON DORRIEN-SMITH, 1872–1918.

THE Isles of Scilly comprise some 365 rocks and islets, situated about thirty miles west of the Land's End. Five only are inhabited, and of these St. Mary's is the largest and Tresco, about two miles to the north across a broad roadstead, is the second. The scenery is on a small scale. No point is higher than 160 feet, and most of the cliffs and rocks are much less. But there is a wonderful freshness in the air, and the colours of the white sand, the blue and sapphire sea, the golden seaweed, the Sea Pinks, the Gorse and Heather, have the brightness of a jewel.

The Isles of Scilly enjoy a very equable mild climate. The temperature seldom varies outside the limits 40° to 60°. The hours of sunshine are about the same as those in Guernsey. There is a good deal of mist, but ten inches less rain than at Penzance on the mainland (about forty miles away). The chief enemy is wind: great gales, of over eighty miles an hour, and sometimes over a hundred, blow from south-west and north-west. In the winter of 1929–1930, to quote one example, there were no fewer than fourteen occasions when the wind rose to over eighty miles an hour.

The modern history of the Isles opens in the year 1834 when Mr. AUGUSTUS SMITH of Ashlyns, Berkhampstead, succeeded the DUKE OF LEEDS as lessee of the islands from the Duchy of Cornwall.

AUGUSTUS SMITH fell in love with Scilly, and ruled there as Lord Proprietor—" Emperor of Scilly," as his great friend, Lady SOPHIA TOWER, used to call him—until his death on 31st July, 1872.

In the early years of the nineteenth century the Isles of Scilly were in a poor way. The islanders were hard put to it to make a living by fishing, piloting, and extracting kelp from the seaweed (a very heavy labour with a very meagre remuneration). AUGUSTUS SMITH encouraged the ship-building industry, raised the general standard of education in the islands and helped the small farmers to find markets for their early potatoes. The result was considerable prosperity.

But in this paper our concern is with the Garden which AUGUSTUS SMITH began on the island of Tresco. When he arrived there was nothing growing on the island above the height of a Gorse bush, save in the little parsonage garden where alone, says Mr. SMITH in October, 1849, " could the pied flycatcher, the reed warbler and other birds find some bushes to perch on." W. J. HOOKER had visited the island some twenty years before, and sketches by him are preserved in Major A. DORRIEN-SMITH'S library. They show three cottages near the scanty ruins of the Abbey and some gravestones. AUGUSTUS SMITH set about planting Elm, Sycamore, Oak and Poplar on the lee side of the hill behind the Abbey to form a mixed cover for game. The first planting of all was about the well. Mr. SMITH also began to build a house for himself on the rocky ground to the north-east above the ruins. It was very strongly built to resist the gales, and its bedrooms were long and narrow like cabins. The earliest date carved on the building is on the outer part—1843 with the initials A. S.

Meanwhile closer still to the Abbey ruins Mr. SMITH built a sheltering wall and began to stock his garden with interesting plants, many of them too tender to be grown in the open on the mainland. Some of these plants were sent to him from Kew, and others came from correspondents in Australia, New Zealand and South Africa, or were grown from seeds brought home by friendly sea-captains. Before long Mr. SMITH increased his shelter belts, using *Quercus ilex* and still more *Cupressus macrocarpa* and *Pinus insignis*. After a time he took more of the hillside into his garden, and the present outline of the garden proper dates back to him. This consists of some twelve acres on the southern slope of the central hill of the island. It has three main walks, the " Top Terrace " of some three hundred yards east to west near the top of the garden, the " Long Walk " parallel to it on the level ground at the bottom, and the " Middle Terrace," a rather shorter walk between the two. There are various paths and steps connecting the three. The main way down is by a series of steps leading straight from an old statue of Neptune on the Terrace Walk to the " Long Walk " below, a distance of about seventy-five yards, and on a further seventy yards to the old brazier of the lighthouse on St. Agnes now set up by the garden wall on the south.

Lady SOPHIA TOWER preserved the letters which her friend AUGUSTUS wrote to her, and after his death had a selection of them, extending over a period of more than a quarter of a century, printed for private circulation. These letters do not contain anything like a complete picture of the garden, but from time to time they give little glimpses of its development. The following are examples:

> *9th May, 1850.* "Scilly is very gay, and still more so, could you take a walk in my garden, though the winds have played sad havoc there of late, breaking and shrivelling the Ixias, Sparaxises, and Mesembryanthemums most cruelly; of these last I have now two of the great large-leaved ones in flower, one being a beautiful yellow, and the other a purple, both as large as Adelaide's face. I am now hammering at the rocks beneath my study windows to extend my mesembryanthemum plantations; this is slow work, and can only be carried on under the master's own eye. I am already indulging in new potatoes from the open ground, and of a very fine size."
>
> *27th September, 1850.* "My gardens are very brilliant, particularly the Fuchsias and Mesembryanthemums."
>
> *13th October, 1850.* "My garden is still in high beauty, and will soon have a fine show of Chrysanthemums; at present, the Guernsey Lilies, lately imported from Mr. Luff at Guernsey, are pre-eminent; they are very handsome, but are nothing to the Bella Donnas as to making a show in the garden. I wish I could send you some of my Red Mullets; I have had so many lately that I have hardly known what to do with them, and of enormous size."

These Guernsey Lilies are *Nerine sarniensis*, originally from Table Mountain, but cultivated in Guernsey for the last two hundred years. The pleasant story of the bulbs being washed up from a wrecked merchant ship, buried by action of wind and tide, the flowers in due course appearing in all their glory, is apparently apocryphal.

> *24th December, 1851* (at Marazion). "I had a spanking passage over on Monday before a fine North-West half gale, and stay here for Christmas with my friend Cole. My garden was left in high beauty, the Clianthus just bursting into flower, and the *Acacia lophantha* also covered with yellow blossoms; . . ."

A sketch of 1851 shows the rocky character of the ground near the house.

> *3rd June, 1852.* "It has been very cold and very wet here of late . . . My garden is, notwithstanding, very resplendent; the first blow of my geraniums is over and the second beginning. The Irises have been very beautiful, as also the Ixias. I have been bringing the Long Walk part of the way in due form as it is to remain, where most of my rareties are planted, and have also been proceeding with the *Mesmerism* garden on the rock on the East side; these have been and are most magnificent; both the large yellow and purple have been covered with big flowers; the Box Myrtle is particularly full, such as I never saw before,

> being covered with bloom, many bushes looking as if powdered with snow."
>
> *27th September, 1852.* "We have had a sharp touch of Easterly wind lately; it has, however, been wonderfully fine, and my garden is looking splendid in consequence. I have had a great triumph as to Guernsey lilies, which are said never to flower twice except in Guernsey, and last year not one of them showed the least signs of bloom; this year, however, they have shot up thin long necks and are now quite in perfection."

There is a sketch of 1854 which gives an alluring glimpse of the Crassulas and Geraniums in the garden.

Early in 1857 Mr. AUGUSTUS SMITH was elected M.P. for Truro (he had narrowly missed the seat when he had been a candidate five years previously in 1852).

> *3rd September, 1857.* "On Saturday was wafted over and landed on these shores in 4½ hours. The Aloe was conspicuous even on landing, being backed from that point by the greenhouse roof; it has grown but little of late, and is not so tall as I had expected, being under 30 feet; it is now coming into perfection, the flowers just bursting. The garden is looking everywhere very gay, but immensely overgrown; I know not where I shall pack my treasures in future."
>
> *20th November, 1857.* "... So many of my rarities are in bloom and beauty that I am in despair at being summoned away, not to return, I opine, till Easter; my Pampas grass is flourishing, but did not flower; my *Fuchsia Dominiana* is doing well out of doors, and is now in blossom; many of the *mesmerisms* are also in full beauty."
>
> *3rd January, 1858.* "This gentle winter has not been unfelt in my garden, which is a blaze of blossoms wondrous to behold; the *Veronica Andersonii*, Correas, Fuchsias, Genistas, and above all *Acacia lophantha* are covered with flowers; one of the last particularly, not less than twelve feet high and as many broad, along the Long Walk, is a perfect picture; the Sedums also, with their large yellow pyramids of bloom, each nearly as big as my lamp papers, are very ornamental—the plant I mean is that the leaves of which are like a green rose, or house leek; some have not less than twenty great ceres on them. The Geraniums of course are as yet all green, and a certain set of *mesmerisms* are also in flower; I am now very busy converting the verandah into stone, which will fully occupy me the month I have to spend here. The upper terrace is also intended to progress so as to be open for loungers by August; it is to be the chief feature of the gardens, and will, I fear, rather make the lower alleys, especially the Long Walk, not a little jealous ..."
>
> *1st June, 1858.* "My garden is a blaze of blossom, especially as to Geraniums; more than usual survived last winter, and whole beds of *Unique*, especially, and other sorts are one mass of flower;

among other curiosities are two bunches of Sweet Peas. The *Dracaena indivisa* is fast advancing to perfection; the flower is not very conspicuous, but a mass of white feathery stems crowning the summit of the plant; the blossom is white; I will bring a sprig to show you."

14th October, 1859. " . . . The garden is looking very well, and the new district called Australia, though still in the rough, has some very brilliant productions particularly of the Aralia tribe, Acacias and Cassias. The Palm also looks well, all the better for his out-door residence; the border along the upper terrace is not behindhand. The new orchard and vegetable garden look pretty well, and will, I hope, be in full cultivation for the French when they arrive."

9th June, 1861. " I have grand botanical promises which I must announce. . . . Two Aloes have announced themselves to be in an interesting situation, which even their crinolines can no longer disguise from the world; these are the great variegated Aloe in front of the Abbey which exhibited some queer little symptoms last year, and the large green Aloe in the Wall Garden, near the one that flowered before. In addition to these, the *Phormium tenax* is going to do likewise. Now I rather think this is a rare event, and the *Metrosideros floribunda* still more so, at least, I have had it may years without any attempt being made at blossoms; it is a very pretty evergreen shrub, and was in the Hop Garden, but lately moved to Australia, which probably is the cause of this new movement. . . . Seven of the Beschornerias have also shot up their blazing red stems . . ."

14th September, 1861. " The gardens are looking very well, and are made a mighty fuss about by visitors, it appears, being a little out of the usual rut and their contents rather peculiar. They are now invaded by excursionists, which would be a bore, did they not really seem to enjoy themselves and appreciate the place and its peculiarities; some fifty were here this week in a body, from all parts of the kingdom, of which a few were really learned in plants, to Chivers's great satisfaction; the Scotch, he says, are the most intelligent, as shown by their questions and observations; the Cornish the least so, and who, when he points out some botanical rarity, answer, ' Well, that's not so good as a cabbage."

25th April, 1862. " The garden is looking very well, with a crowd of Cinerarias in flower in the open air, such as I have never seen here before; *sparrow grass* has been plentiful this month and more; the plants never seem to have suffered less than this winter. Among other rarities that have survived is the *Mandevilla suaveolens.* The Pitcairnia is an extraordinary-looking affair, with its spikes now above 9 feet from the ground; from appearances some weeks will elapse probably before the flower expands; there are six stems; the proper name I believe to be Puya, a native of Chile . . ."

There is a sketch of 1862 showing the Aloes in flower and cushions of Mesembryanthemums on the open hill beyond the garden itself.

> *14th December, 1862.* "... All the garden is now green and flowery, particularly with Veronicas and the *Sparmannia africana*, which has been in full bloom since October, and does not seem tired of putting on its best."

Mr. AUGUSTUS SMITH was an ardent Freemason, and in 1863 he was installed as Provincial Grand Master of the Province of Cornwall. He was also President of the Royal Institution of Cornwall.

> *6th December, 1864.* "We have had heavy gales, but very intermittent, with beautiful fine sunny calm weather and seas intermixed; the thermometer has never descended lower than 39°, and that only once for a few hours. I have had some very beautiful Australian plants in flower, particularly *Hakea suaveolens*, which seems to be quite hardy; the Polygolas are also very full of blossom, and become quite an important feature."
>
> *19th January, 1866.* "A gale from N. and N.E. is very rare, but very destructive when it does come. Of the firs covering the hillside between the Abbey and the farm ... at least a third have been more or less displaced, many completely uprooted, particularly towards the farm end, where they were largest and thickest. But for the grandeur of the devastation, I could almost have cried."
>
> *3rd June, 1866.* "There has been a cold East wind with a good deal of rain. My garden therefore is very slow in recovering its good looks, and appears yet very *seedy* and like an invalid; the Puya, however, shows one stem for flower, but no Aloe as yet; both the *Chamearops excelsa* and *C. humilis* are throwing out large buds; as for *Dracaenas* and *Beschornerias*, I have a forest of both already in full blossom. ... Our potatoes here are equally deranged, being terribly cut up, and very backward, and fetching no price in the London market. ..."
>
> *24th January, 1867.* "What weather! Wet, wet, wet, after snow, snow, snow and frost, frost, frost; the two latter I brought over with me twelve days back. The islands were all white, having about three inches depth of snow, which was renewed from time to time, as much melted, the frost not being at all severe, indeed the thermometer was never below 28°, and generally stood at 30°. Last Sunday there was a very heavy gale from the S.E. and a French vessel was stranded in Pentle Bay, just at the end of Penzance road.
>
> *21st March, 1867.* My garden is gay with bulbs and other flowers, and every two or three days a tidy dish [of] asparagus makes its appearance. ... I really think I must go abroad next winter to get a good warming to make me comfortable for the close of my life."
>
> *10th May, 1868.* "The *Puya chilensis* (Fig. 89) is now just in high beauty. ... My garden besides can boast many great beauties,

particularly as to Beschornerias and Mesembryanthemums; these are at least a month earlier than usual, owing no doubt to the dry season."

10th July, 1868. "This Guinea-fowl and Mesembryanthemum summer is as much as I can support with the assistance of real marine breezes. We are getting terribly burnt up; but have had some heavy dew for the refreshment of turnip and mangold."

15th September, 1869. "We have been visited by a very severe fit of equinox. I never saw the foliage so damaged by any storm before, just as if it had been struck by a hot blast; all my flowering Aloes, alas, are snapped right off, just below the first flowering branch, except one small one that was too dwarf to be noticed by the gale. . . . I once had the silver tree you saw at General Huyshe's; its botanical name is *Leucadendron argenteum.*"

12th May, 1871. "*Memerisms* . . . promising to be very fine this year, and seem to be forwarder than usual, the large purple being already one grand blaze of beauty."

Wasps were first seen in the Isles of Scilly this year.

There are several interesting photographs of Mr. AUGUSTUS SMITH; one of himself with a group of pilots, another of himself by a hedge of geraniums in the garden, a great bank 15 feet high. He died on the mainland, and was buried, as he wished, in the Churchyard of St. Buryan (1872)—that "busy, thoughtful, resolute man," as one of the obituary notices said, "who had a glove of velvet for his friends, and a hand of steel for his foes." He was never married.

A list of some of the plants growing all the year round in the Tresco Garden was published in the *Gardeners' Chronicle* on August 24, 1872.

The first reference to Tresco in *The Botanical Magazine* occurs in Volume 98 (1872). Under Table 5973 *Olearia dentata* the record states "a fine bush in the Scilly Isles where it was introduced by Augustus Smith Esq., it is believed from Kew, many years ago." The Editor, Sir JOSEPH DALTON HOOKER, adds, "I had the pleasure of visiting the gardens about fifteen years ago with my late friends Professor HARVEY of Dublin and VEITCH (the grandfather and founder of the firm) when we were all astonished and delighted with the luxuriance and variety, especially of the Cape and Australian vegetation they displayed."

AUGUSTUS SMITH was succeeded in 1872 by his nephew THOMAS ALGERNON DORRIEN SMITH, a Lieutenant in the Tenth Hussars. In 1875 he married EDITH, daughter of his uncle's great friend Lady SOPHIA TOWER. They had seven children, and at Tresco they resided for eight months in each year.

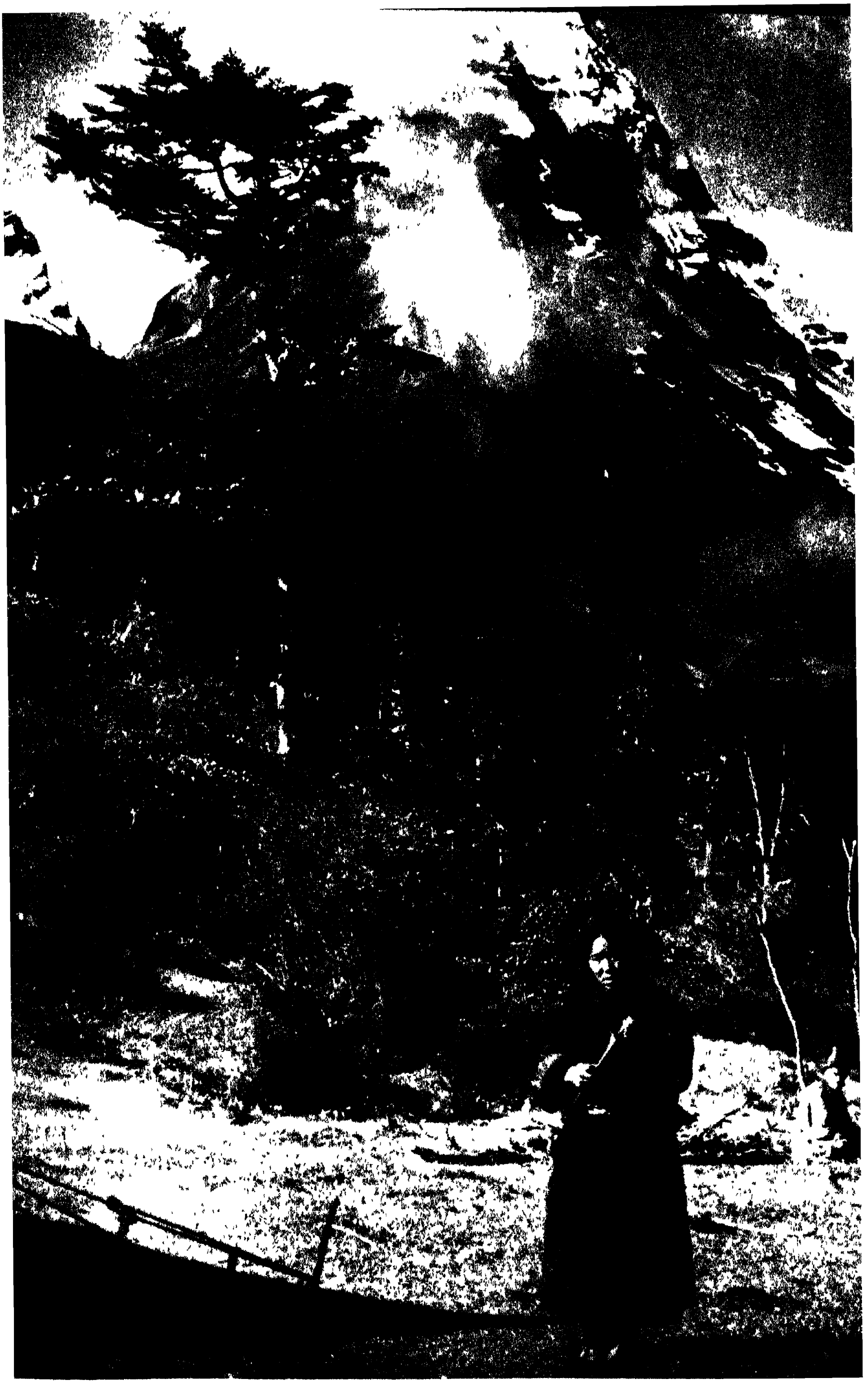
It was THOMAS ALGERNON who started in the islands the cultivation of the Narcissus for the market, an industry which has proved to be the most remunerative of all the Islands' industries. The 'Scilly White' and the 'Soleil d'Or' he found growing about the Abbey ruins.

Possibly they had been introduced by the monks. As an experiment he persuaded Mr. TREVELLICK who held a farm on St. Mary's to send up some flowers to Covent Garden. He put them in a hat box and realized a pound for them. The first Flower Show to be held in the Isles of Scilly took place on Tuesday, March 30, 1886, when THOMAS ALGERNON showed upwards of 160 varieties of Narcissus, arranged on a groundwork of green moss.

A brief account of the development of the industry in the Isles of Scilly appeared in *The Times* of Friday, May 29, 1896. By that time all the leading varieties of Narcissus had been tested, Mr. DORRIEN SMITH himself growing about a hundred and fifty sorts, but the bulk of the exports were obtained from less than a dozen. The two earliest have already been mentioned: 'Soleil d'Or,' with its rich yellow perianth and deep orange cup, for the first crop; and 'Scilly White,' with white perianth and sulphur-white cup, for the second. The mainstay of the third crop were the Tenby Daffodil, *Narcissus pseudo-narcissus obvallaris*, and *Narcissus poeticus* (var. 'Pheasant's eye'). The staple of the fourth crop was *N. princeps*, another variety of the common Daffodil (*N. pseudo-narcissus*). By this year (1896) Mr. SMITH had about thirty acres under this cultivation, with ten houses to force the earlier varieties.

Meanwhile the plants in the garden had been growing and a number which AUGUSTUS had never seen in flower came into blossom in the 'seventies and 'eighties. The great enemy still was wind. One day after a severe storm THOMAS ALGERNON, sailing up the channel, noticed a tree standing up among a number of others which had blown down. He took a bearing on it and found it to be *Pinus radiata* (*insignis*). This gave him an idea, and he started planting a shelter belt of this tree on the South Western Hill. Major ARTHUR DORRIEN-SMITH, the present Lord Proprietor, remembers as a boy helping to plant this area. This additional shelter has proved invaluable for later developments, and many trees and plants in the garden have attained larger dimensions than they usually do in their native and original habitat.

The best idea of the flowers in the garden in the first ten years of THOMAS ALGERNON'S reign can be obtained by the study of a remarkable series of paintings by Mrs. LE MARCHANT, sister of AUGUSTUS, now preserved in the Abbey Library. There are 44 plates in all, many of them dated, and the dates run from 1873 to 1883. The earliest date is found on Plate 10 (which depicts the following as flowering in January, 1873: an Acacia, *Escallonia macrantha*, *Hakea suaveolens* with squat brushes of fragrant white flower tinged with pink, *Pittosporum Tobira*, *Tetranthera* (=*Litsea*) *japonica*, *Westringia rosmariniformis*. On Plate 12 the following are shown in blossom at the end of February the same year (1873): another Acacia, the handsome salmon-pink spike of *Aloe soccotrina*, the bright yellow of *Edwardsia microphylla*, *Genista albiflora procumbens*, the pink-and-white *Hakea denticulata*, the Morning Glory *Ipomaea jasminoides*, *Leptospermum bullatum* (flowers white with pink centre), and the blue-flowered *Salvia*



PLANT COLLECTING IN SOUTH-EASTERN TIBET

–Takpa Shiri. A Peak on the Himalayan Axis above Chickchar in the Sanctuary. In the district around Takpa Shiri many new species of have been discovered (See p. 173)

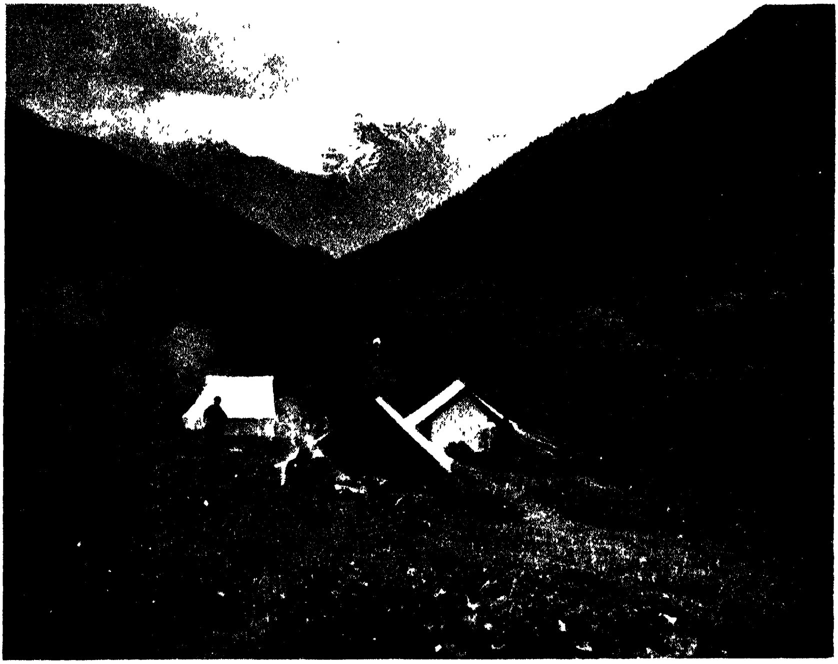


Fig. 73. Camp on the Nyima La. The snow-capped range, about fifteen miles distant and beyond the Tsangpo, is the Himalaya in the neighbourhood of the Doshong La

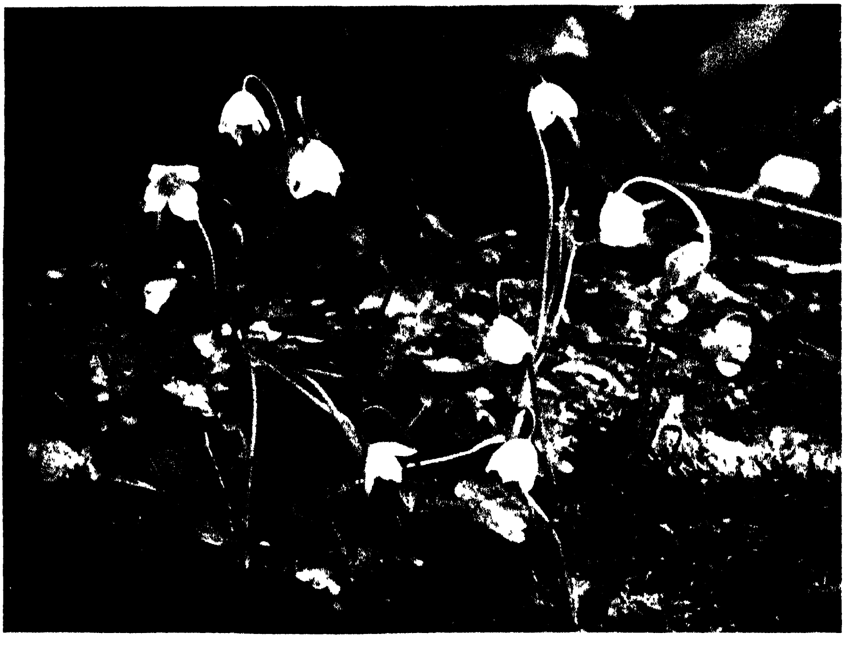


Fig. 74.—Meconopsis lyrata on the Doshong La (See p. 142 April)

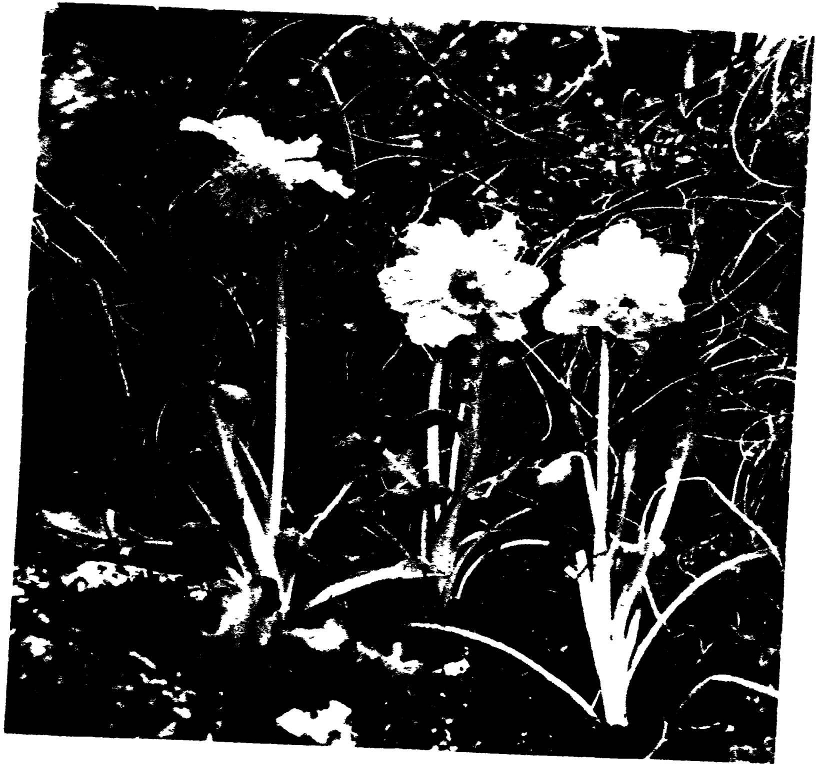


Fig. 75.—Meconopsis argemonantha var lutea. A habitat

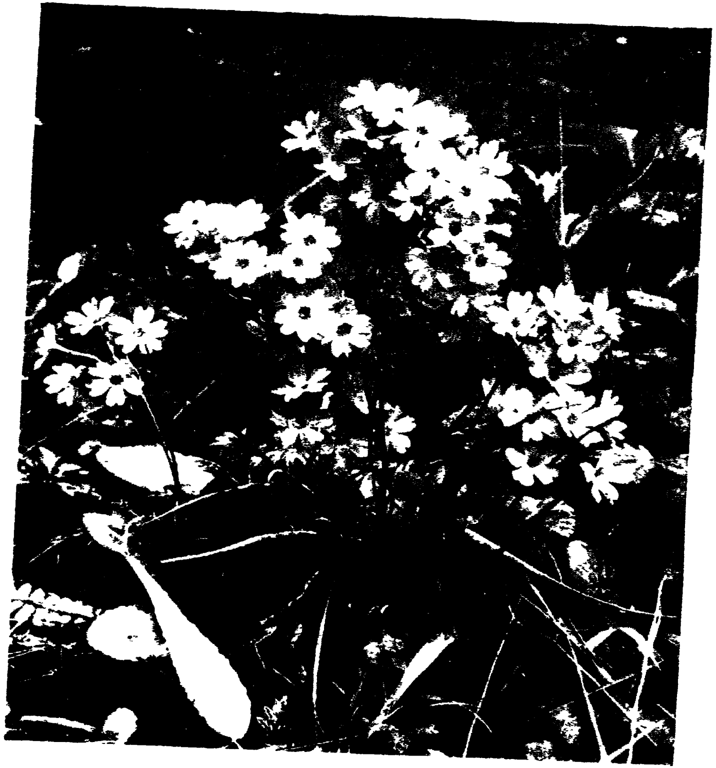


Fig. 76. Primula Jaffreyana. A dry zone plant

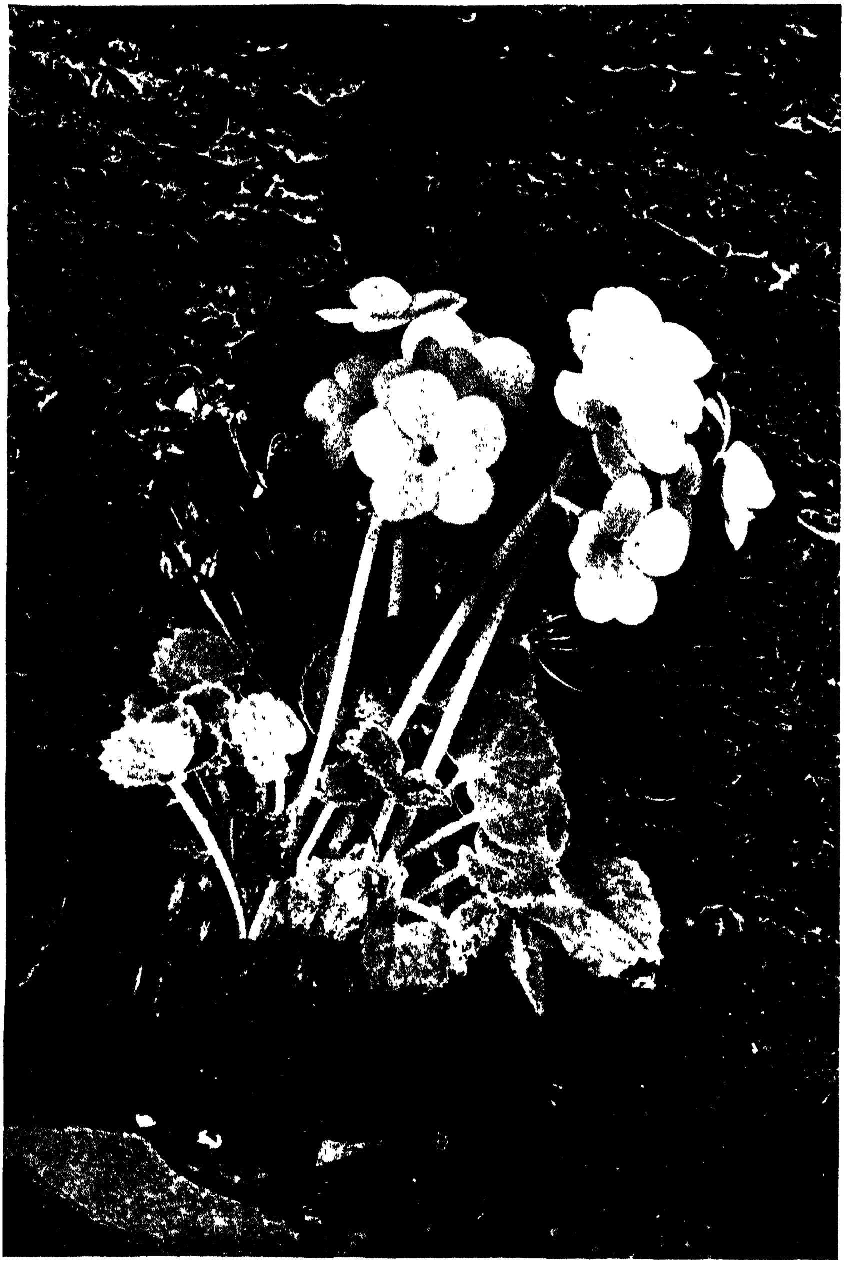


FIG. 77.—PRIMULA LITTLEDALEI. IN A SOIL POCKET OF A ROCK FACE, PROTECTED FROM DIRECT RAINFALL BY OVERHANGING ROCKS (See p. 168)

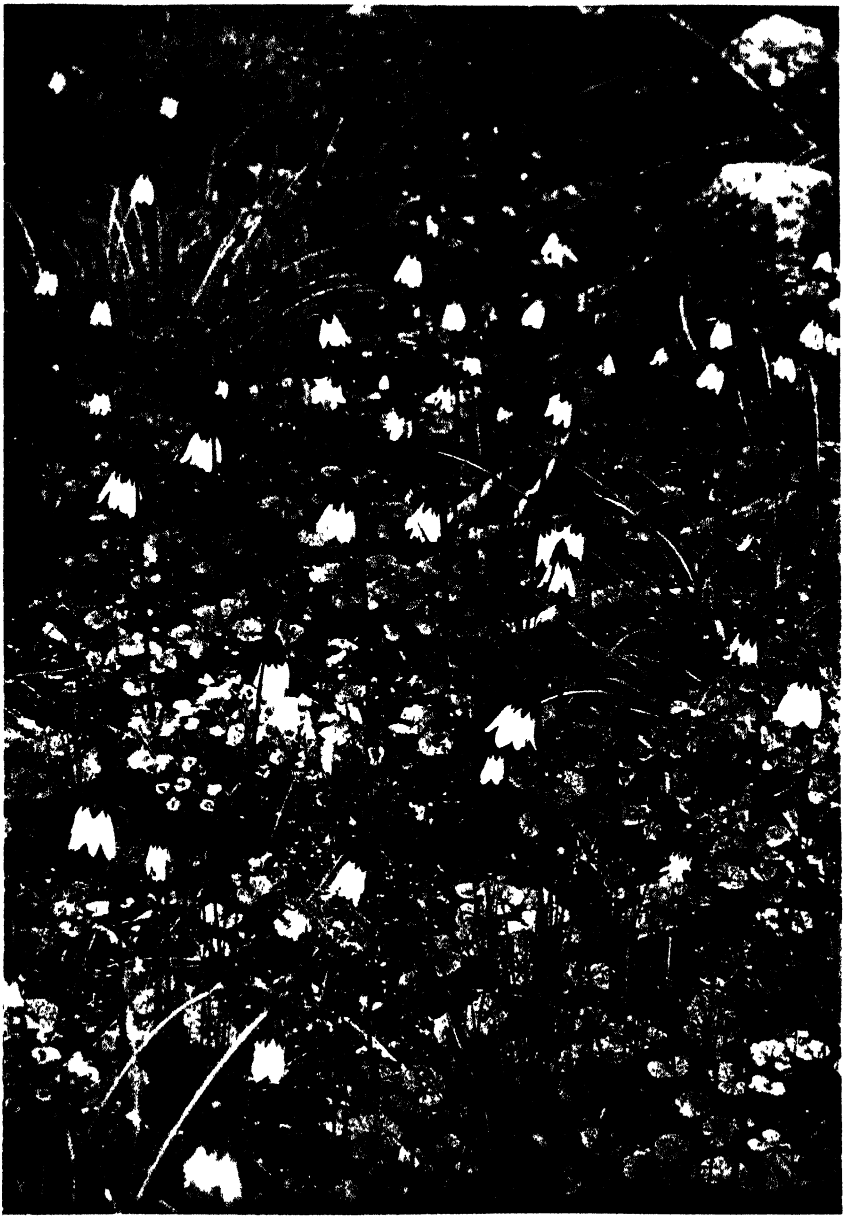


Fig. 78.—Cremanthodium palmatum subsp. rhodocephalum The Saxifrage in the left foreground is S. megalantha (See p. 169)

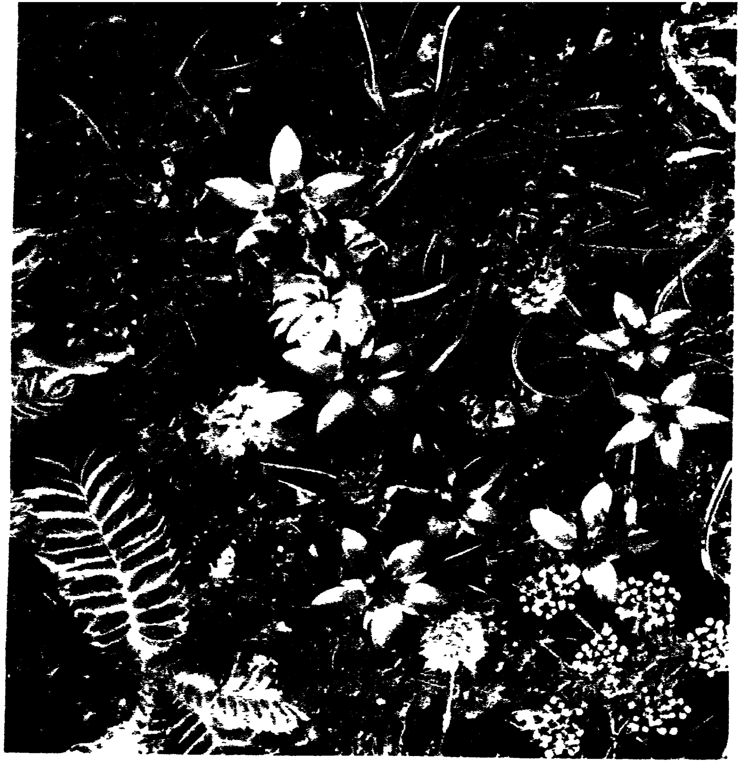


FIG. 79.—GENTIANA TSARONGENSIS (See p. 168)

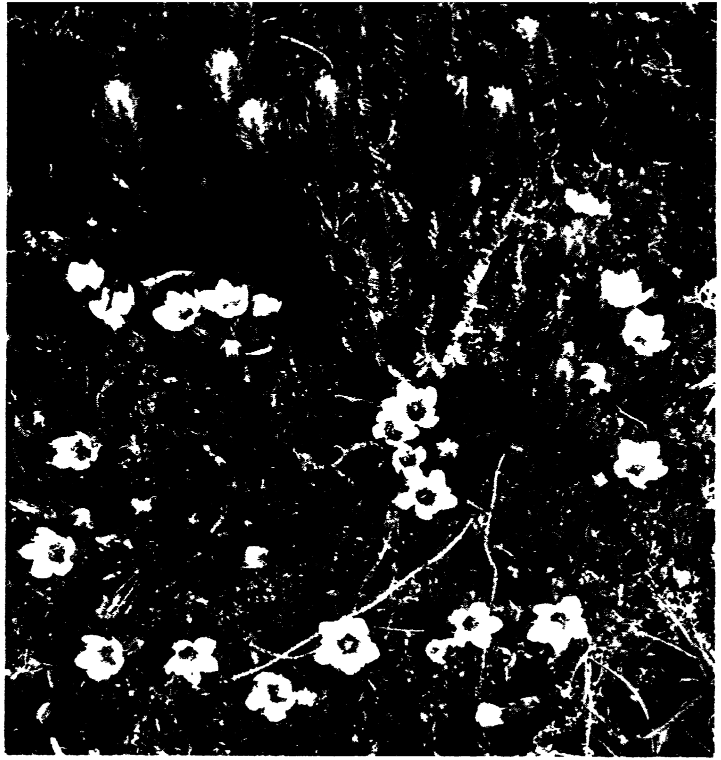


FIG. 80.—GENTIANA DECORATA BESIDE A NON-FLOWERING PLANT OF CASSIOPE WARDII

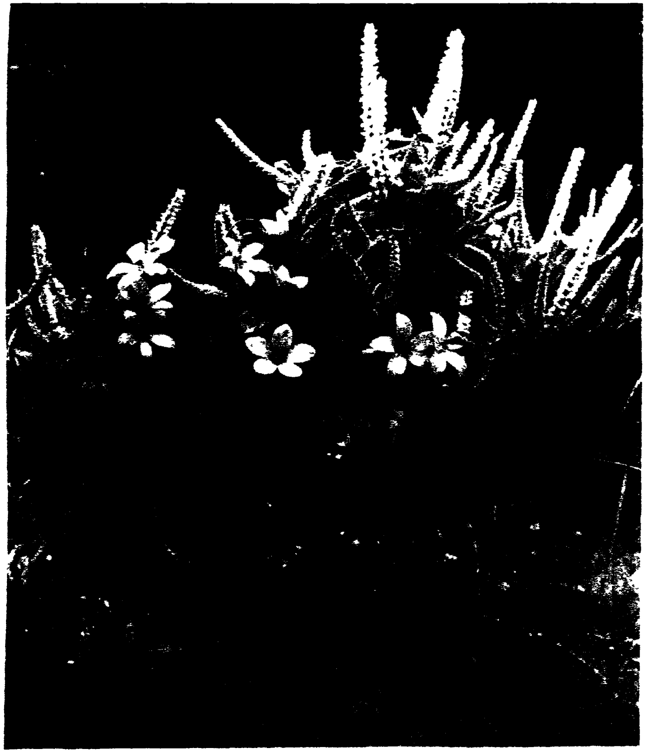


Fig. 81. Codonopsis vinciflora twining on flowering stems of Elsholtzia sp. (See p. 171)

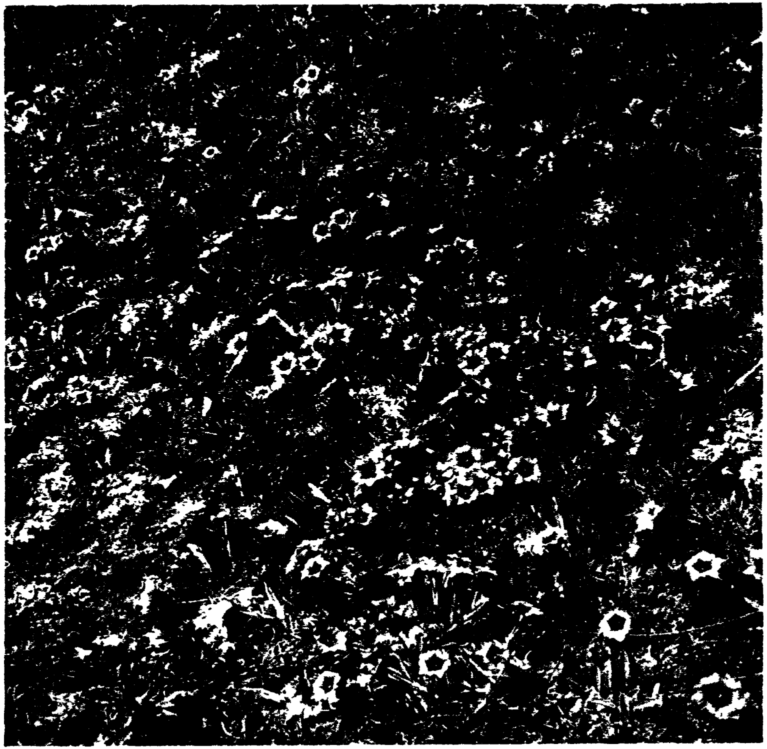


Fig. 82.—Gentiana Veitchiorum growing on an Alpine pasture
(See p. 173)

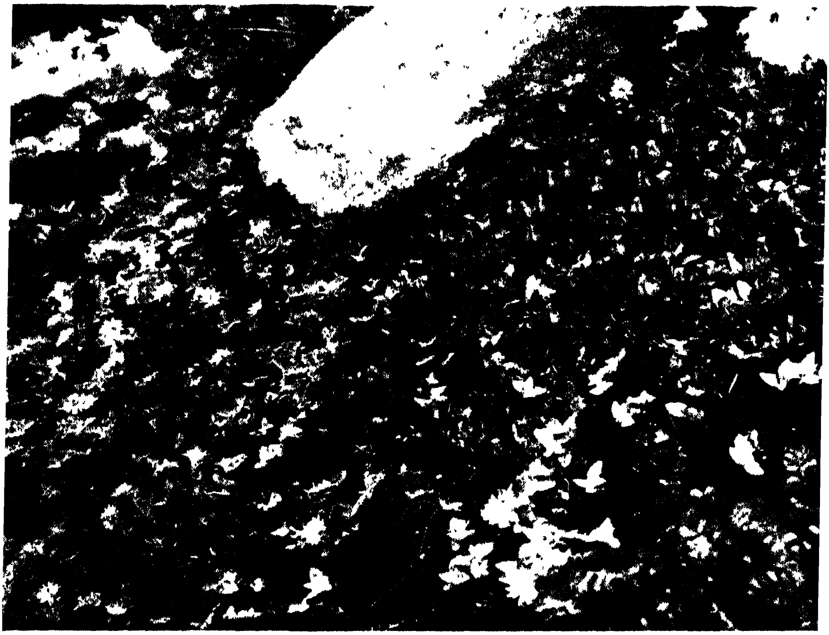


FIG. 83.—GENTIANA SHERRIFFII (See p. 169)

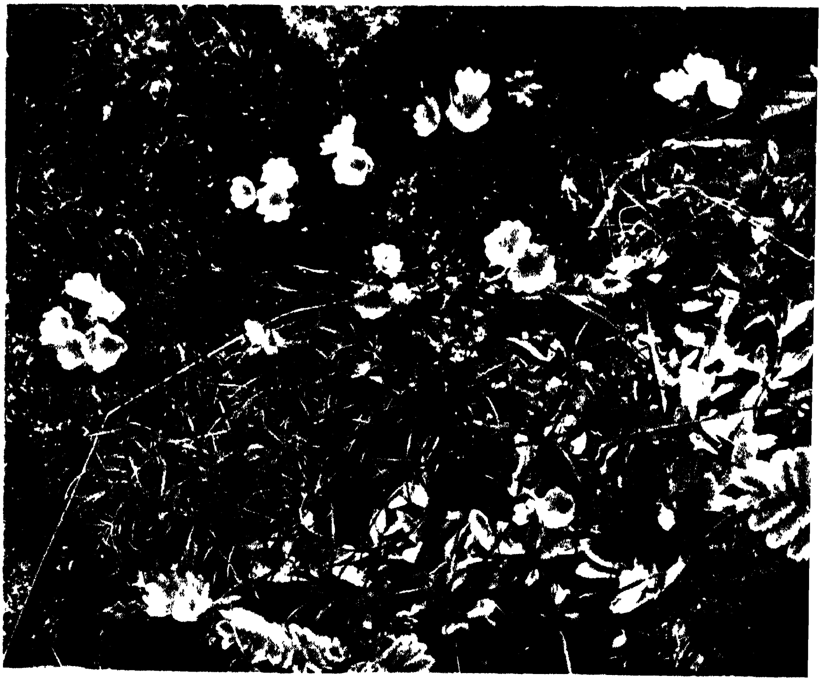


FIG. 84.—PRIMULA ALICEAE (See page 144 April)

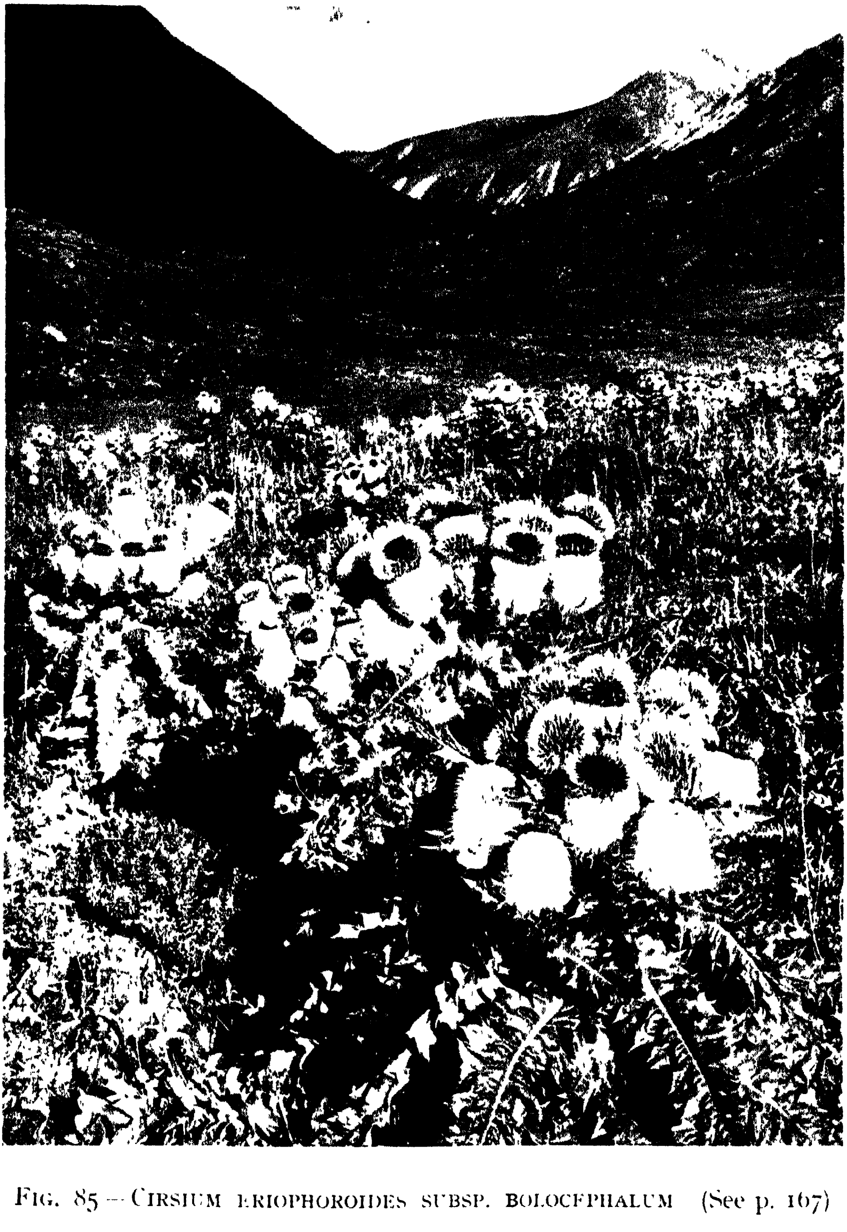
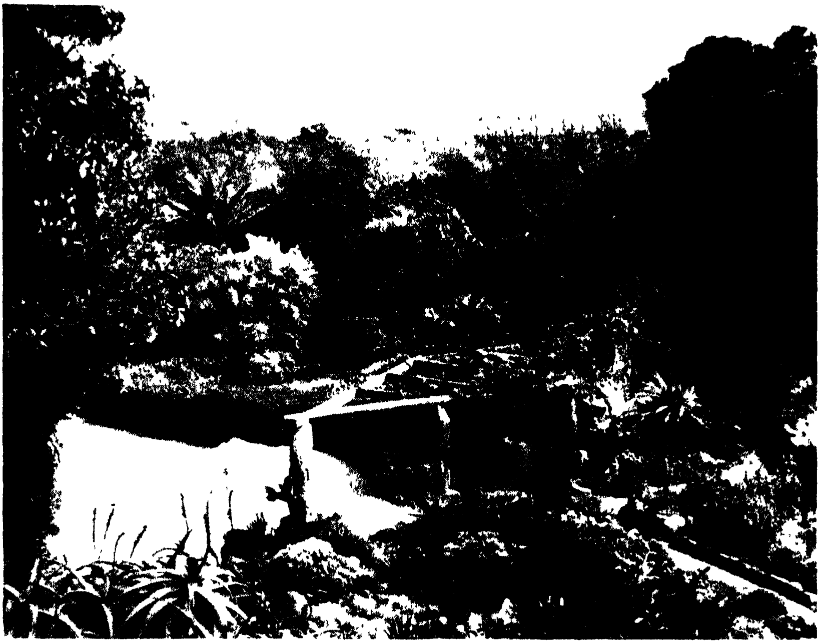
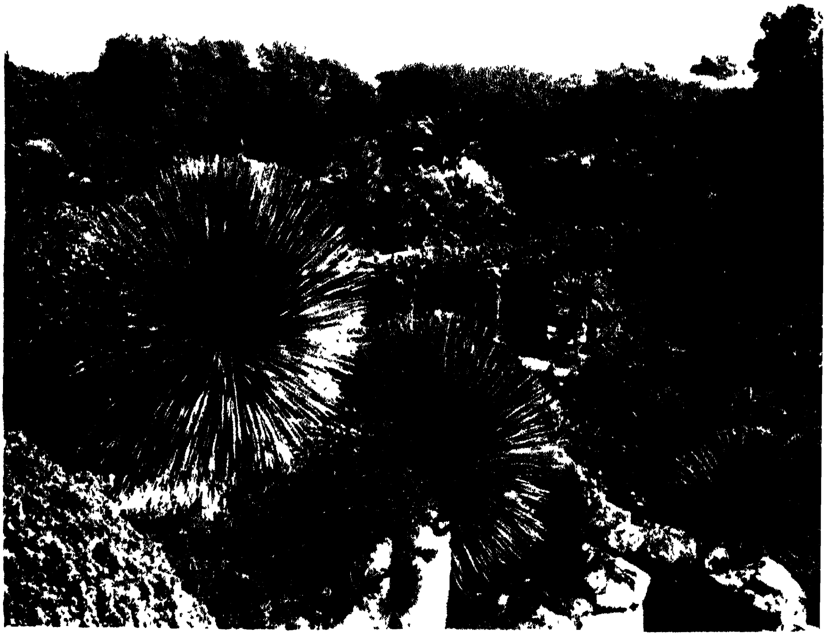


FIG. 85—CIRSIUM ERIOPHOROIDES SUBSP. BOLOCEPHALUM (See p. 167)



Photos, James Gibson.

Fig. 86. The Garden looking South: the Island of St. Mary's in the distance and on the right the largest Metrosideros tomentosa in the Garden



THE GARDENS AT TRESCO ABBEY

Fig. 87. Dasylirion acrotrichum

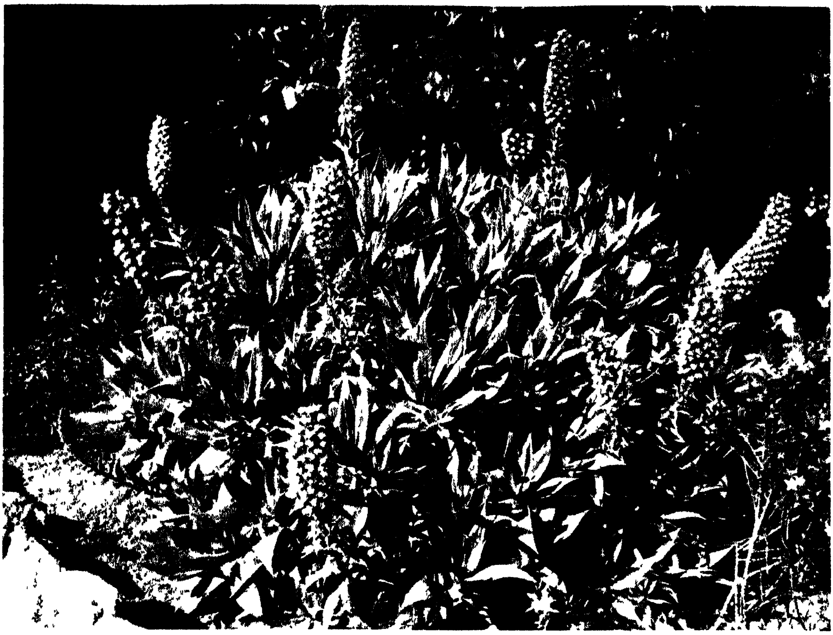
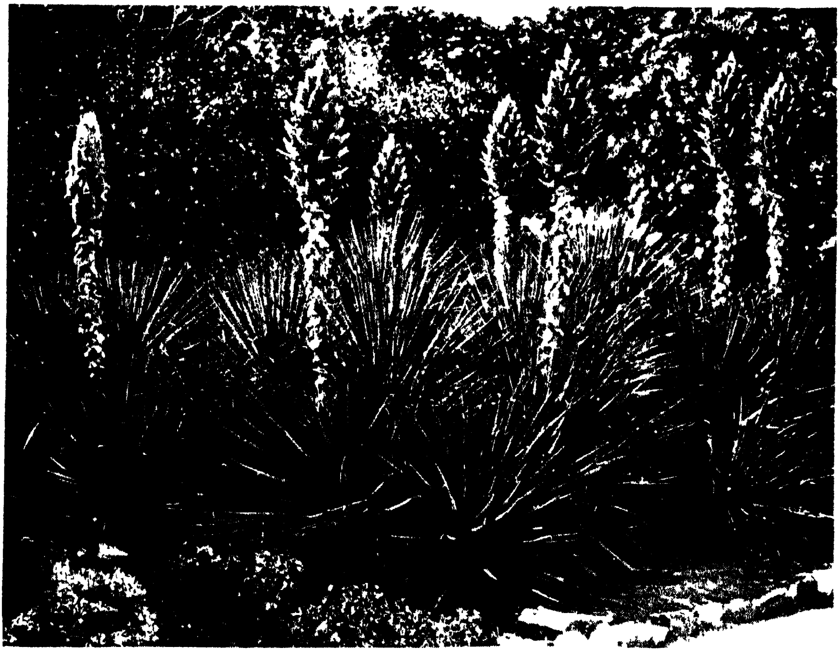


Fig. 88 Echium callithyrsum



THE GARDENS AT TRESCO ABBEY

Fig. 89.—Puya chilensis (See p. 182)

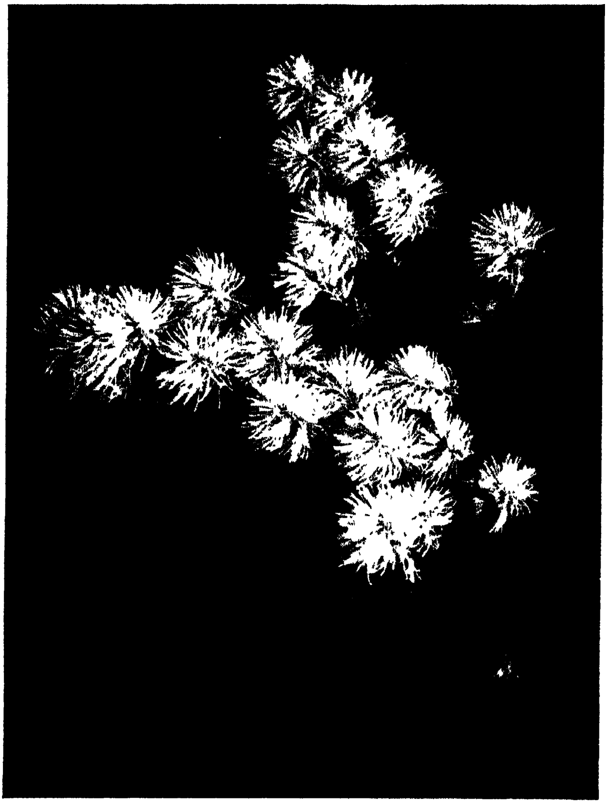
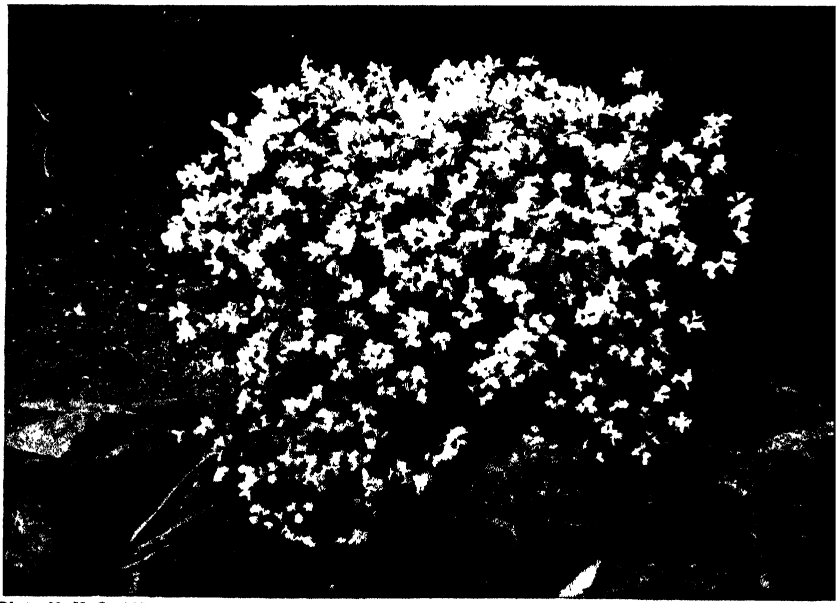


Photo R A Malby.]

FIG. 90.—FOTHERGILLA MAJOR (See p. 192)



Photo, N. K. Gould.]

AWARD OF GARDEN MERIT

FIG. 91.—GENISTA LYDIA (See p. 192)

argentea. Plate 6, also dated 1873, includes the bright pink of *Escallonia organensis* and the white of *Escallonia floribunda alba* (both flowering in April), *Eucalyptus saligna* (flowering in June), a Psoralea with feathery green leaves and purple-and-white pea-like flowers, and a bright orange *Arctotis grandiflora* (flowering all the year round). These are three charming plates.

For October, 1873, Plate 1 shows a *Fuchsia splendens* (scarlet, tipped pale green), the Camphor Tree *Laurus Camphora* (*Cinnamomum Camphora*), the long leaves of *Aster argophyllus* (= *Olearia argophylla*), the green leaves bronzed underneath of *Elaeagnus spinosa* (*angustifolia*), *Pittosporum undulatum* with its green seed boxes, and *Malvastrum capense.* For October and November Plate 5 similarly gives *Cantua buxifolia* with its long narrow tubes of pink striped with yellow, *Cassia corymbosa, Colletia bictonensis* (*cruciata*), *Escallonia montevidensis, Eugenia Ugni,* a *Lithospermum, Schizostylis coccineum,* a Sedum, *Solanum pseudo-capsicum,* and the white flowered African Hemp, *Sparmannia africana.*

The following year in November (1874) *Furcraea longaeva* is shown (Plate 24) with the little new plants forming on the branches.

For March and April, 1875, we have another beautiful group in Plate 18, which includes two Correas (*alba* and *virens*), a Fritillary with small chocolate flowers depending from a stalk, and an Acacia. April of that year is further represented by Plates 19–21 which give an Acacia, a couple of Aloes, an Erodium with small blue-purple flowers from the Cape, two Hakeas (*oleifolia* with white flowers, and *microcarpa* with very thin leaves), a Melicytus with greenish tufts of flowers on a slender green stem with light green leaves. *Scilla peruviana* with a head of purple flowers, *Olearia Fosteri* with large leaves, grey underneath, and stalks of very small greenish flowers, Sparaxis white, red, yellow and purple, and *Viburnum Sandankwa* with a rather knotty dark brown stem, broad leaves, and largish panicles of white flowers slightly suffused with pink.* Plate 2, of the same year, gives a spray of the flower of *Furcraea longaeva* which is said to have blossomed in June and July, 1875, for the first time. There seem to have been three of these plants in the garden and two of them flowered during the season, reaching the height of 17 and 20 feet respectively. † There is a photograph inserted in the volume showing *Furcraea longaeva* flowering together with *Dracaena draco* (not in flower), and JAMES JENKINS as a boy of about twelve years of age in a wide brimmed hat. He was later to become the Head Gardener and to hold that position for many years.

That same July 48 Agaves were in blossom.‡ *The Gardeners' Chronicle* of December 25, 1875, depicts a group of *Agave americana* in full flower and mentions hedges of Pelargoniums 14 feet high. It also gives a list of 39 plants which were in flower in November.

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* *V. Sandankwa* from Tresco is the subject of Table 6172 in the *Botanical Magazine* (Vol. 101, 1875.)

† *Gardeners' Chronicle*, January 15, 1876.

‡ *Ibid.*, and *cf. G.C.*, December 7, 1876—*Agave mexicana* at Tresco.

Plate 27 dated the year following (1876) shows part of a flower of *Puya chilensis*, a succulent head of florets with yellow petals and golden stamens. For 1877 we have in Plate 33 two Aloes, *saponaria* and a variety of *mitriformis*. Their rosettes of leaves are shown with spikes rising from them. Dated August of the same year is a picture of the New Zealand Flax, *Phormium tenax*, in flower (Plate 36).

For the year 1878 we have two notes in the *Gardeners' Chronicle*. On May 25, Mr. G. D. VALLANCE refers to *Pittosporum undulatum*; on July 6 he speaks of *Eucalyptus globulus* in flower and 30 feet high, and there is a reference to the fact that Mr. DORRIEN-SMITH generously allowed cuttings to be given to anyone who desired them, on application to the Head Gardener.

No fewer than eight Plates are dated 1879. For May we have Plates 41 and 43. The former, a most attractive painting, gives *Pyrus Maulei* (*Chaenomeles japonica*), one of the most charming of red-flowered dwarf Quinces; *Banksia littoralis* (dated November 1878) with brown heads of flowers; *Erica Cavendishiana* with yellow tubular flowers; and *Pyrethrum grandiflorum*, a slender Marguerite. The latter (Plate 43) depicts *Embothrium coccineum*, a *Swainsonia* whose delicate stalk is sprinkled with small whitish pea-like flowers, and the Mexican *Bravoa geminiflora* with large flowers of a handsome reddish-yellow. Plate 44 is dated July of the same year (1879) and includes *Arthropodium cirrhatum* with white flowers in panicles, and *Dianella tasmanica*. Plants represented in the other plates dated this year are as follows:

Plate 4.—*Eucomis punctata* from South Africa, *Raphiolepis ovata*, with thick leaves and fragrant white flowers, and a Nerine

Plate 7.—*Clethra arborea* from Madeira with racemes of fragrant Lily-of-the-valley flowers, still a notable feature of the garden; an Aloe; and *Gasteria nigricans*.

Plate 8.—*Anigozanthos rufa*, the curious Monkey's Paw from Australia; the yellow *Oxalis crassifolia* still plentiful in the garden; an Aloe; and the Cobweb Houseleek *Sempervivum arachnoideum* with striped flowers of a light pink.

Plates 37 and 38.—A blue Aloe, *Aloe prolifera* (*brevifolia* var. *depressa*) and the young leaves of the Blue Gum, *Eucalyptus globulus*.

A letter in *The Garden* dated November 15, 1879, describes a recent visit to Tresco. The correspondent writes:

> " I found several Agaves 25 feet high in flower, and in the open air such plants as *Dolichos lignosus*, *Lapageria rosea*, *Rhyncospermum jasminoides*, and in fact, a whole host of New Holland plants."

In the *Gardeners' Chronicle* (January 15, 1881), Mr. J. G. MITCHISON of Penzance describes a visit to Tresco Abbey on January 6, and an interview with Mr. VALLANCE, the Head Gardener. " Mr. Vallance," he says, " has to dress forty to fifty glasses and vases several times a week." Mr. MITCHISON speaks of *Aloe soccotrina* as magnificent. He also specially mentions *Acacia* (*Albizzia*) *lophantha*, and he counted eighty-three plants in full bloom, many of them of an unusual size.

For January 1882 we have three Plates (11, 14, 25) and for January and February one (31), as follows:

Plate 11.—One of the most charming of all, includes an Oxalis with a large white flower; *Callistemon liniaris*, a Bottle-brush from Australia with flowers of purple-pink; *Eugenia apiculata* (*Myrtus luma*), with a white flower and dark purple fruit; an Epacris; and a tall sprig of *Escallonia pterocladon* with small white flowers.

Plate 14.—A Mesembryanthemum; *Melaleuca hypericifolia* with salmon-pink flowers and capsular fruit; and *Senecio mikanioides*, the German Ivy from South Africa.

Plate 25 is again one of the most charming, and it depicts: *Habrothamnus* (*Cestrum*) *elegans* with tight-packed clusters of red-purple flowers; the beautiful white *Abutilon, Boule de neige*; a pink Correa (named as *Correa pulchella = speciosa*); *Pittosporum crassifolium* from New Zealand, showing both its chocolate flowers and a seed-box open containing shiny black seeds.

Plate 31.—Another delightful picture, includes *Escallonia rubra* with small delicate red flowers; *Anopterus glandulosus* with large succulent darkish-green serrated leaves and loose panicles of small whitish flowers; a Statice with attractive heads of small blue-purple flowers with yellowish centres; a fine branch of *Acacia* (*Albizzia*) *lophantha* with sulphur-coloured brushes of flowers; and *Crowea saligna* with rosy purple flowers (dated October, 1882).

In 1883 Plate 18a gives a great brownish head of flower of *Agave felifera* in September; and Plate 13a the serrated leaves and the dome-shaped thistle-head of bluish flower of *Banksia serrata* in October.

Next year (1884) Mr. C. A. M. CARMICHAEL contributed a lively account of a visit to the Abbey Gardens to *The Garden*, October 18 (No. 26, pp. 333-335). He was struck by the exhilarating bright green foliage of *Cupressus macrocarpa*, hundreds of them, along the three-quarter mile drive; and among other plants he mentions the following: *Sparmannia africana*, 30 feet high and thick in proportion; a path with a bank of Hydrangeas on one side and Fuchsias 20 feet high on the other. On the rock-work near the house there was a row of *Agave americana* and Pelargoniums (*macranthum*, 'Shrubland Pet,' 'Rollisson's Unique,' 'Prince of Orange,' etc., etc.) flowering all through the year. There were Yuccas, Crassulas, Mesembryanthemums, Cacti, Aloes (e.g. *spicata, depressa, chinensis, saponaria, soccotrina, ciliaris*), *Apicra deltoides*, *Rochea perfoliata*, and *Cotyledon velutina*. Every crevice was planted closely with Sedums or Echeverias, and any little gap closed by *Sempervivum tabulaeforme*.

On March 31, 1886, in a severe storm large quantities of glass at Tresco were destroyed by hail.

An unnumbered plate in the Abbey collection, dated 1889, includes *Brachysema acuminatum* with fat pointed chocolate buds and dark green leaves grey underneath, and a Swainsonia with rose-purple heads of pea-like flowers. The remaining plates in the collection are undated, but they evidently belong to the same period—the 'seventies and 'eighties of the last century. Among the plants represented are

(Plate 3) *Myrsine tenuifolium* with red stems and crinkly light green leaves ; *Polygonum complexum* from New Zealand and *Acacia diversifolia* ; (Plate 9) *Acacia brachybotrya ; Myoporum laetum*, and a *Calothamnus*. Plate 15 includes the yellow flowers of *Candollea cuneiformis, Lachenalia versicolor*, the red lobster-claws of *Clianthus puniceus*, the light pink of *Diosma speciosa*, the purple tubes of *Paulownia imperialis*, and three large Mesembryanthemums, purple, orange and darker orange.

A fine plate (16) includes *Eucalyptus coccifera* with two different kinds of leaf and whitish rosettes of flowers ; *Psoralea pinnata* with blue flowers and very narrow leaves, the bright red brushes of a *Callistemon*, the small daisy-like flowers of a Sedum with yellow petals, the great smooth shiny leaves of *Griselinia lucida*, a *Babiana* and a light purple Ixia. Plate 17 gives the Nutmeg Plant (*Myristica*) with large yellowish-green leaves and rather ragged looking reddish flowers ; and *Vitex littoralis* with pink flowers and large leaves.

Another outstanding Plate (22) includes *Crassula decussata* (white) ; *Convolvulus mauritanicus*, whose delicate flowers are blue-purple with white stamens ; and *Funkia lancifolia* with a spike of lavender.

In yet another skilfully arranged and beautifully painted Plate (23) we find the red flowers of *Metrosideros robusta* with long leaves, yellowish green above and greyish below ; *Diosma hirta* with fine leaves and tufts of purple flowers ; the slender long tubular flowers of *Antholyza praealta*, reddish tinged with yellow, on a red stalk ; *Olearia dentata*, with medium-sized Michaelmas-daisy-like flowers on a thick greenish stalk ; *Drimys aromatica*—besides others.

Plate 26 shows the slender green stalk of *Kennedia alba* with panicles of greenish-white flowers ; *Pittosporum crassifolium* with tiny chocolate flowers and leaves dark green above and grey beneath ; *Eucalyptus globulus* with its long leaves ; and *Edwardsia grandiflora*.

In Plate 28 we find an *Acacia* with very thin stalk and leaves and sparse yellow balls of flower ; a Peacock Iris of a very beautiful delicate blue ; *Mesembryanthemum tricolor ; Melaleuca taxifolia* with white brushes of small flowers ; a bright orange *Morea ; Citharexylum cyanocarpum* (*Rhaphithamnus cyanocarpus*) with small blue tubular flowers ; and *Pomaderris lanigera* with long yellowish-green leaves and sparse spikes of small starry yellow flowers.

Plate 29 includes *Tradescantia virginiana* with a flower of dark purple ; the orange flowers of a Kafir Lily (*Clivea Gardneri*) ; the fat red stalks and reddish flowers of *Beschorneria yuccoides* ; and a Brodiaea with purple flowers.

Plate 30 shows the hybrid Dracaena (*D. Scilloniensis*) with slender stalks of tiny white flowers. *Teucrium fruticans* and *Buddleia globosa* occur in Plate 32 ; *Ornithogalum arabicum* in Plate 39, also *Aponogeton distachyus*, the South African pondweed, and a Jaborosa.

Plate 40 gives *Phygelius capensis*, with light red tubular flowers hanging from a slender succulent brown stalk ; a knobbly branch of *Illicium religiosum* (*anisatum*), the sacred aniseed tree of the Japanese, with dark pointed leaves and greenish yellow flowers ; and a beautiful bright blue *Dianella caerulea*.

The South African succulent, *Gasteria carinata* is shown in Plate 42.

On April 16, 1890, Mr. T. A. DORRIEN-SMITH read a very interesting paper to the Royal Horticultural Society at Chiswick on "The Progress of the Narcissus Culture in the Isles of Scilly"; and he contributed a short note to the *Gardeners' Chronicle* in 1891 (December 19) recording a *Eucalyptus globulus* recently blown down by a gale as probably the oldest Gum Tree in England. Another note in the same Journal in 1893 (June 10) speaks of hundreds of Dracaenas then in bloom and fragrant. Another in 1895 (March 30) describes acres and acres of Lilies in several hundred varieties, and ten spacious glass structures for Tomatoes. Two notes in 1898 refer to the flowering of *Cordyline australis* (March 12) and to *C. indivisa* at Tresco (March 26) with a picture of gathering Narcissus.

In December of this year (1898) Mr. S. W. FITZHERBERT described in *The Garden* (December 10, pp. 473–474) "An August visit to Tresco Abbey Garden." There had been a long spell of dry weather that year and so the flowering of Crassulas and Mesembryanthemums was a good deal curtailed. Mr. FITZHERBERT says that there were 120 varieties of the latter under cultivation, and between forty and fifty varieties of Agave.

In the same Journal in 1902 (April 5) Mr. FITZHERBERT gave an account of "Early March in Tresco Abbey Garden." The Acacias then were a fine sight; among others *dealbata, longifolia* and *melanoxylon*, a splendid tree about 50 feet high covered with pale yellow flowers against a background of dark Firs. Trees of *Sparmannia africana* 12 feet high, both single and double flowered, were in full bloom. There was good yellow flower on great bushes of *Cytisus racemosus*, and a White Broom as well. *Mesembryanthemum productum* was a sheet of rosy purple, and *M. aurantiacum* was beginning to show its brilliant orange.

The same year (1902) saw the beginnings of another collection of flower paintings, this time by Miss GWEN DORRIEN-SMITH. They are bound in two handsome volumes, and the first date appears to be January 1902 on pictures (1) an orange Kniphofia, and (2) an Acacia in a blaze of yellow. The bright colours of these paintings give a good idea of the brilliance of the garden in the sunshine. Good examples are (4) a purple Veronica (February 1905), (8) blue Iris (March, 1904), (13) dark blue Echiums, (22) Gazanias on a border (May, 1905), (26) *Abutilon vitifolium* (May, 1904); and in Vol. II (8) Metrosideros, (9) a fine Aloe (July, 1904), (22) Belladonna Lilies on the side of a path (October, 1906), (26) Sempervivums flowering (December, 1905).

There is also a volume filled with about fifty gay little paintings of various Mesembryanthemums, and another containing fifty similar watercolours of bright Pelargoniums. These are by G. and C. DORRIEN-SMITH (about 1908).

Meanwhile Mr. DORRIEN-SMITH'S eldest son ARTHUR had come of age (1897) and had been awarded the D.S.O. in the South African war. On June 1, 1901, there was a great luncheon at Haresfoot in Hertfordshire to celebrate the return of Major-General HORACE

SMITH-DORRIEN from the war. Mrs. SMITH-DORRIEN was present in her seventy-seventh year with all her fourteen sons and daughters, including Mr. ALGERNON and his daughter CICELY FRANCES. The luncheon party broke up to receive Mrs. LE MARCHANT, then in her ninetieth year, who arrived driving her own pair of cobs.

The first of the well-known Spring Flower Shows at Truro took place on Wednesday, March 17, 1897, when Mr. JOHN CHARLES WILLIAMS of Caerhays was President, and Mr. ALGERNON DORRIEN-SMITH, Vice-President. To the second Show the following year (March 15, 1898), Mr. DORRIEN-SMITH sent a collection of Narcissus and several tropical and sub-tropical plants. The third Show (March 21, 22, 1899) was attended by a deputation from the R.H.S. which included Miss WILLMOTT and the Rev. W. WILKS. The best display of Narcissi came from Scilly, and Mr. DORRIEN-SMITH was awarded a Gold Medal of the R.H.S. He also exhibited cut sprays of flowering shrubs among which were: *Grevillea rosmarinifolia, Ribes speciosa, Ilex dipyrena, Leptospermum bullatum, Genista filipes* (clothed with white blossom), *Edwardsia grandiflora, Acacia dealbata, A. melanoxylon, A. grandis, A. armata, Andromeda japonica, Viburnum rugosum, Pittosporum Tobira,* and *Solanum crispum.*

Two very interesting papers were contributed to the *Kew Bulletin* by Captain ARTHUR DORRIEN-SMITH. The first (1908, No. 6) was on "The Southern Islands Expedition." The expedition left New Zealand in November, 1907, to explore the Snares, the Aucklands and the Campbells, and encountered a great deal of thick, drizzling weather. *Veronica elliptica* and *Metrosideros lucida* are typical plants of that area. The second paper (1910, No. 4) described "An Attempt to introduce *Olearia semidentata* into the British Isles." Captain DORRIEN-SMITH found acres and acres of that lovely Olearia in full bloom in a peat bog on the Chatham Islands. He also contributed two articles of similar interest to the R.H.S. JOURNAL. The first was in 1910 (XXXVI, Part II), on "A Botanizing Expedition to Western Australia in the Spring (October) 1909," and the second in the following year (1911, XXXVII, Part I) on "Plants of the Chatham Islands." Captain DORRIEN-SMITH, not only on these expeditions but also earlier in the South African war, collected plants and seeds which enriched the Tresco garden. He kept a sharp eye open as he rode over the veldt and had some of the most striking plants he saw packed up and sent to Scilly.

From 1906 onwards *The Botanical Magazine* frequently refers to plants grown at Tresco. The following is a list of references:

Vol. 132 (1906)
  Table 8087, *Rhodostachys pitcairniifolia* (Chile).
Vol. 135 (1909)
  Table 8291, *Euryops virgineus* (South Africa).
Vol. 136 (1910)
  Table 8301, *Agonis marginata* (Western Australia).
  Table 8305, *Pittosporum Colensoi* (New Zealand).
  Table 8331, *Psoralea affinis* (South Africa).

Vol. 137 (1911)

Table 8379, *Prostanthera pulchella* (Australia), a plant presented to Kew by T. A. DORRIEN-SMITH—in Tresco a shrub flowering in April. Introduced to English gardens by Captain A. A. DORRIEN-SMITH.

Table 8407, *Aciphylla latifolia* a handsome umbellifer, introduced by A. A. DORRIEN-SMITH from the Auckland and Campbell Islands.

Vol. 138 (1912)

Table 8419, *Leptospermum scoparium* var. *Nichollii* (the name has now been corrected to *Nicholsii*), introduced by Captain A. A. DORRIEN-SMITH from New Zealand, 1908.

Table 8420, *Olearia chathamica*, a plant imported by Captain DORRIEN-SMITH from the Chatham Islands in 1908, flowered at Ludgvan Rectory in June, 1911.

Vol. 139 (1913)

Table 8524, *Senecio Kirkii* (New Zealand).

Vol. 140 (1914)

Table 8550, *Olearia semidentata* (Chatham Islands)—flowered at Scilly, July, 1913.

Vol. 141 (1915)

Table 8628, *Metrodiseros diffusa* (North Island, New Zealand)—flowered at Tresco, April 1914.

Vol. 143 (1917)

Table 8705, *Senecio Hectori* (New Zealand)—flowered July, 1913, at Kingshill, Berkhamsted.

All four of these were introduced by Captain DORRIEN-SMITH.

In 1918 THOMAS ALGERNON DORRIEN-SMITH died. The simple inscription on the monument on the hill above the garden records his name and adds: "he devoted his life unselfishly to these islands and added greatly to their prosperity and beauty." He was succeeded by his eldest son, now Major DORRIEN-SMITH, who still reigns at Tresco.

(To be concluded)

THE AWARD OF GARDEN MERIT—LXXIX

331. DAPHNE RETUSA

Award of Garden Merit, July 15, 1946

The two Daphnes which have previously received the A.G.M. (*D. Cneorum* and *D. Mezereum*) are both European plants. We may now add a Chinese species, *D. retusa*, which was first discovered in 1889 by A. E. PRATT in W. Szechwan, and collected in the same district in 1903 by E. H. WILSON. It was raised at the Coombe Wood Nursery by Messrs. J. VEITCH & Sons, who supplied flowering material for the *Botanical Magazine* plate (t. 8430).

It is a compact, low-growing evergreen shrub with oblong dark leaves usually from 1 to 2½ inches long, obtuse or notched at the tip and narrowed at the base to a short petiole. The flowers appear in the spring, from terminal buds, in crowded clusters surrounded by fresh green shoots developing from the lower buds. The sweetly-scented perianth is white with a hint of rose or mauve on the inside, externally rosy-violet. *D. retusa* approaches *D. tangutica*, differing mainly in having more hairy young branches, broader and less revolute leaves, and more obtuse perianth-lobes.

332. GENISTA LYDIA

Award of Garden Merit, July 15, 1946

This, the fifth species of Genista to receive the A.G.M., has been in cultivation about twenty years, and has proved to be a first-class shrub for a sunny, well-drained place in the rock garden or the front of the shrub border. It is of semi-prostrate habit, eventually forming a hummock up to two feet high of wiry, grey-green, arching growths which, by repeated branching, make a dense mass of short, curved twigs, covered in May and June by innumerable small, bright yellow flowers. In nature, *G. lydia* is widely distributed in the Balkan Peninsula, extending into Asia Minor and Syria. (Fig. 91.)

333. FOTHERGILLA MAJOR

Award of Garden Merit, June 17, 1946

The Fothergillas are N. American shrubs belonging to the same family as the Hamamelis, the Witch Hazels. They have no petals and the flowers consist of numerous long stamens arranged in short spikes not unlike the bottle brush. *F. major* forms a rounded bush, in old specimens reaching a height of six to eight feet. The flowers are creamy in colour due to the long stamens and the yellow anthers. They are borne in rather cylindrical spikes up to two inches long. This Fothergilla grows well in a mixture of peat and sandy loam and flowers freely in May. It is also a good plant for autumn colouring, the leaves generally turning a brilliant orange-yellow, sometimes orange-scarlet before falling. This Fothergilla is a native of the Allegheny mountains ranging from Virginia to S. Carolina and was first grown in English gardens in 1780, but subsequently lost and later re-introduced. It is featured in the *Botanical Magazine* as *F. alnifolia var. major* (T. 1342). Mr. BEAN writes that it is scarcely specifically distinct from *F. major* although it is said to be of a more spreading habit. (Fig. 90.)

334. × PHILADELPHUS LEMOINEI 'ERECTUS.'

Award of Garden Merit, July 15, 1946

The hybrid Mock Orange × *Philadelphus Lemoinei* was raised from a cross made by LEMOINE of Nancy in 1884 between *P. microphyllus* and one of the garden varieties of *P. coronarius*. The seedling plant flowered two years later and provided material for an engraving which appeared in *Garden and Forest* in December, 1889.

Since that date repetition of the cross has given rise to a range of forms differing in habit. All are shrubs of medium size, neat in foliage and generous in the production of very fragrant white flowers. 'Erectus,' the form most commonly found in gardens at the present time, differs from most of the others, as its name suggests, in its more upright habit. 'Avalanche,' which received the A.G.M. in 1936, is one of the more spreading forms of this group.

BUD AND FLOWER DROPPING IN LUPINS

By L. G. G. Warne

Botany Department, University of Manchester

De La Rue (1) in 1936 showed that the formation of an absciss layer at the bases of the petioles and their subsequent shedding in *Coleus* and *Ricinus*, after removal of the leaf blades, was delayed by hetero-auxin applied in lanolin to the cut ends of the petioles. Similar results have been reported for *Phaseolus vulgaris* by Portheim (3). Later, Gardner, Marth and Batjer (2) found that the abscission of almost mature pome fruits could be delayed or prevented by suitable sprays of growth substances, and recently Vyvyan (4) has reviewed later work on this subject. A chance observation here in 1937 showed that abscission of Lupin flowers is similarly prevented by spraying the inflorescences with growth substance solution. These observations appeared to be of some practical interest, as one of the chief defects of many garden varieties of Lupins is the readiness with which, under certain circumstances, they shed both buds and flowers, either from inflorescences still attached to the plant or after cutting. No opportunity arose to make further observations on this point until recently.

In the original (1937) experiment inflorescences of annual Lupin, with the buds showing colour, were sprayed with (*a*) water (controls); (*b*) α-naphthyl-acetic acid (0·05%); or (*c*) β-indolyl-acetic acid (0·05 %); and whereas in the controls all buds and flowers had been shed after a lapse of nine days, both the lots of sprayed material retained their flowers.

In 1946 more extensive trials were carried out. In the first set of experiments ordinary blue Lupins (*L. polyphyllus*) were used. Inflorescences were cut, transported quickly to the laboratory and treated within about four hours of cutting. The controls were left unsprayed and the treated inflorescences sprayed either with β-naphthyl- or a α-naphthyl- acetic acid with results shown in Table I.

The α-naphthyl- acetic acid clearly exerts an inhibiting effect on the processes of bud and flower dropping. The effects with the β-acid are only slight and are less at the higher than at the lower

Table I

Number of inflorescences	Growth substance used - acetic acid	Concentration	Mean number of buds and flowers dropped per inflorescence	
			In 2 days	In 3 days
11	Control-	—	102	132
10	β-naphthyl-	0·04	72	108
12	do.	*0·08	96	129
10	α-naphthyl-	0·04	27	66
11	do.	0·08	24	39

Not completely dissolved

concentration. With the α-naphthylacetic acid treatments shedding was almost entirely confined to the apical part of the inflorescence where the buds were immature and small and tightly packed so that thorough wetting of their pedicels in the spraying process was probably not achieved.

Even more striking results were obtained in a series of trials with several varieties of Russell Lupins. Here the growth substances used were β-indolyl- or α-naphthyl-acetic acid.

The inflorescences were collected at about noon on June 18, 1946, and brought to the laboratory and treated at 5 P.M. (G.M.T.). Most of the material used had the lowest flowers of the inflorescence fully opened but with a few varieties (shown in the table) the inflorescences were rather more mature, bearing small fruits at the base.

The results are assembled in Table II.

TABLE II

Variety	No. of inflorescences	Growth substance used – acetic acid	Concentration	Mean No. of buds and flowers shed per inflorescence	
				In 18 hrs	In 69 hrs
			%		
Josephine	5	Control		23·2	120·6
	5	β indolyl-	0·08	4·6	28·6
Bishopsgate (pods at base)	2	Control		0·5	170·5
	3	β-indolyl-	0·04	3·0	8·7
Mrs Micklethwaite	2	Control		77·5	85·5
	2	β-indolyl	0·08	0·5	7·5
Lady Miles Mitchell	2	Control		80·5	132·5
	2	β-indolyl-	0·04	2·0	19·0
Lady Beatrix Stanley	4	Control		41·5	134·5
	4	β-indolyl	0·04	1·5	29·5
Maud Tippetts	4	Control		105·0	134·0
	6	β-indolyl-	0·04	1·8	17·8
	4	α-naphthyl-	0·04	1·7	12·5
Patricia of York (pods at base)	2	Control		43·0	125·5
	2	α-naththyl	0·08	0	32·0
George Russell	2	Control		44·0	61·5
	2	α-naphthyl-	0·08	0·5	17·0
Nellie Allen	5	Control		55·6	147·4
	5	α-naphthyl-	0·08	4·4	37·4
Phyllis Cooper	4	Control		52·5	70·2
	4	α-naphthyl-	0·08	5·5	21·5

Although the number of inflorescences of each variety available was small, the results are so clear-cut that the validity of the conclusions drawn cannot be doubted. All the varieties responded to the treatments, the response consisting of a delayed and reduced bud and flower drop. Dropping in the treated inflorescences was as before, mainly of small buds tightly packed together and difficult to wet in the spraying process. The several varieties differed in the degree, but not in the nature, of the response. To what extent these observed varietal differences are a result of the varietal characteristics or ascribable to slight differences in the degree of maturity of the inflorescences cannot be stated. Neither is it possible to state that either of the two growth substances used is more effective than the other or that the higher concentration employed is more effective than the lower. Further, although under the conditions of these experiments bud and flower abscission in the cut inflorescences was retarded or prevented, it must be pointed out that the causes which generally lead to the occurrence of this phenomenon are obscure. Fertilisation leading to rapid ovary development usually inhibits shedding of flowers past maturity and it is possible that absence of fertilisation is one of the major causes leading to the abscission of flowers that have reached the pollinating stage. Immature buds may be shed also and non-shedding of these cannot be ascribed to the effects of pollination and fertilisation. Hence it cannot be inferred that, because the treatments given have been effective in partially inhibiting bud and flower drop in these experiments, that they will so do under all other sets of circumstances. It is suggested, however, that these or similar treatments might offer a method of combating one of the chief defects of Lupins as cut flowers.

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SHORT NIGHTS: AN UNAPPRECIATED HINDRANCE TO MAIZE CULTIVATION IN ENGLAND

By B. C. Sharman, B.Sc., Ph.D.
(Botany Department, The University, Leeds.)

DURING the last year or two, notes or longer articles on the cultivation of sweet corn and other types of maize have become increasingly frequent in the horticultural literature, but so far there seems to have been no mention of what is probably the most fundamental obstacle hindering any easy cultivation of this interesting plant in these latitudes. The difficulty lies in the fact that by far the majority of maize strains cannot tolerate the short nights of our northern summers. In this connection it is interesting to notice that whenever anyone in England writes in terms of having successfully produced " a fine, heavy sample of rich orange, well shaped and filled grain " (5), he is growing his plants in a comparatively low latitude, in say Kent, Bedfordshire or the Home Counties, at least south of about 53° N., i.e. a line drawn across from the Wash.

The reactions of plants to different lengths of daylight are extremely complex,* but sacrificing certain aspects of the matter for the sake of simplicity, one can say that most plants fall into one of two categories, (*a*) " short day " plants which require a certain minimum of night before they will develop inflorescences (parts bearing flowers) and (*b*) " long-day " plants which will develop inflorescences even if continuously illuminated, and, in fact, do so earliest under these conditions (e.g. wheat).

It so happens that, in common with many other semi-tropical plants, most strains of maize are markedly " short-day " (" long-night ") types, and if grown under conditions with too long a length of daylight per 24 hours, they either take a considerable time to reach the flowering stage or are unable to do so at all. Now although the term " daylight " has been used above, quite a low intensity of illumination can be effective, for example light of the order of that provided by a common 40 watt bulb at a distance of 20 feet or more. It is even said that for some plants the light of the moon is sufficient.

From the spring equinox onwards, not only does each successively more northern town have a longer period between sunrise and sunset, but each also has a longer period of twilight before sunrise and after sunset, during most of which the intensity is sufficient to be appreciated by the plant. The twilight effect is rarely commented upon but is quite marked : thus in the latitude of Leeds or York for example, for about a week before and after midsummer (June 24) the northern sky is never really dark.

Table I will show the general trend : the figures are derived from data kindly extracted for me from the *Nautical Almanac*, by A. DRUMMOND, Esq., of Kew Observatory. The column headed " Nautical twilight " contains the total of the times before sunrise and after sunset during which the sun is between the horizon and 12 degrees below it. The figures thus used for the length of twilight will serve to show the general variation from north to south, at a date (May 9) about mid-way between the spring equinox and midsummer, and midsummer (June 25). Of course it may well be that the illumination during the whole of this arbitrarily defined period is not sufficiently strong to be appreciated by the plant : on the other hand there is also the converse possibility that some of the time included in the column " Remainder of the 24 hours " does not count as " night " for the plant. Nevertheless, these figures in conjunction with those for the period from sunrise to sunset, do at least give some indication of the great difference between the north and the south.

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* The note (and bibliography) by TINCKER (9) may perhaps be a useful starting point for the reader unfamiliar with this type of problem.

TABLE I

Date	Town	Latitude N.		Sunrise to sunset		Sunset to sunrise, divided into:— "Nautical twilight"		Sunset to sunrise, divided into:— Remainder of the 24 hrs.	
		°	′	hr	min	hr	min	hr	min.
May 9, 1946	Newcastle	54	58	15	40	3	46	4	34
	York	53	57	15	32	3	32	4	56
	London	51	31	15	12	3	12	5	36
	Dover	51	7	15	10	3	8	5	42
June 25, 1946	Newcastle	54	58	17	22	6	38	0	0
	York	53	57	17	8	5	24	0	13
	London	51	31	16	38	4	6	3	16
	Dover	51	7	16	34	4	0	3	26

Before following further the implications of this day-length effect, it is necessary to go a little deeper into the biology of the plant and consider another facet, namely the earliness or lateness of the change over from vegetative growth to reproduction. All the cereal grasses like barley, oats, wheat and maize (and perhaps many other plants outside the grasses) have a sort of internal "timing mechanism." Thus if the plant is growing under conditions of constant light and temperature, it will not change over to flower development (or more accurately, to inflorescence development) until it has initiated a certain number of leaves, the number required varying with the conditions. Now this timing cannot be altered by variations in manurial treatment: experiments have shown that not even wide variations in the available nitrogen, potassium or phosphate (or their proportions) have any influence on the number of leaves produced before the plant begins to develop its inflorescence (PURVIS (7), SHARMAN unpublished) nor do variations in the moisture content of the rooting medium have any effect (unpublished). Again, cutting down the rate of carbohydrate manufacture by removal of part or the whole of each leaf blade as it appears, has no influence on the number of leaves produced before the change over to reproduction (for maize, unpublished, for wheat see (8)).

On the other hand an alteration of the timing *can* easily be brought about by growing the plants under a different period of illumination per day, and also perhaps by growing them at a different temperature.* It seems to be a general rule that shortening the night (i.e. increasing the daylight length), reduces the number of leaves which must be produced, both in short-day plants like maize and long-day plants like wheat. In maize, however, although shorter nights lead to some lowering of the leaf number, this is accompanied by a tremendous slowing down of the *rate* at which they are produced. Thus the plants need initiate less leaves but take longer to do so, as suggested in the diagram in Fig. 1. In other words, although the "internal alarm clock" is now set to go off at an earlier hour, the hands travel round much more slowly. Apparently in a long-day plant like wheat, this slowing down effect either does not operate or only does so to a much smaller degree, so that the overall effect of a reduction or elimination of "night" in these plants is an early onset of flower production, since the plant is still "working" at about the same speed but now has only a low leaf number to achieve.

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* At present there is practically no useful information on the relationship between temperature and leaf number in Maize: what little there is with regard to Wheat, Rye, etc., shows that low temperatures during the early growth (i.e. at germination and immediately after) can cause a considerable lowering of the leaf number provided the day length is moderate or short: unfortunately the reactions of Maize are unknown, nor is there any information as to leaf number in either Maize or Wheat when the plants are grown to completion under different temperatures. Since temperature only seems to have a marked effect at low values and then only under moderate or short days, the present note is confined to the more important implications provided by daylight length.

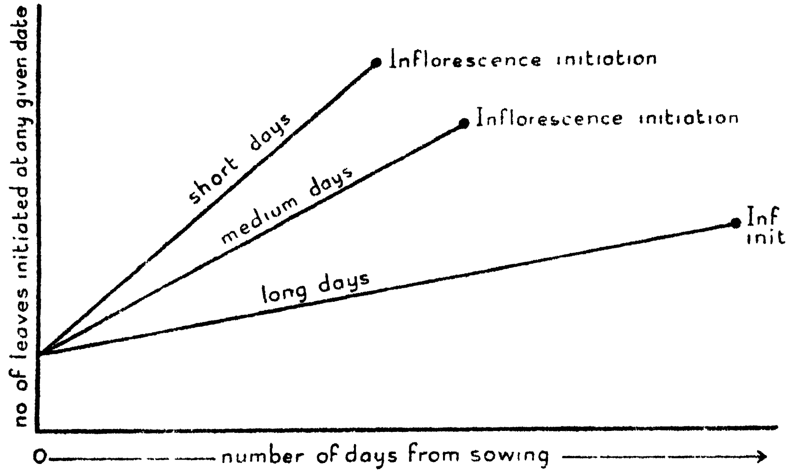

FIG. 1.

Now the "internal timing mechanism" controlling leaf number, seems to have a very real entity of its own and to be something independent of the mechanism which is so prominent in maize and other short-day types and which causes the slowing down of leaf initiation when such plants are suffering from too short a night.* The suggestion that the two effects are independent is well supported by the behaviour of barley, rye or wheat, all of which are long-day plants: if different pure lines of these species are grown under continuous illumination, it is found that although each particular variety must produce its own definite number of leaves before flowering, some lines, usually called spring types, need only initiate about eight, whilst others of the so-called winter types must produce up to about 25, the actual number being definite for each particular variety. (As long ago as 1927 DOROSHENKO (3), (4) and (6) showed that amongst both the spring and winter types, the strains from different latitudes were adapted to different photoperiods). The effect of the make up of the particular strain may be expressed diagramatically as in Fig. 2. Thus in wheat, rye, etc., although growing the plants under longer days leads to a reduction in the leaf number, for any given period of illumination per day (as indicated at the line X—X in Fig. 2—say 19 hours daylight plus 5 hours night), some varieties have got to produce more leaves than others before they change over to reproduction. This type of variation also occurs in maize and is essentially the factor which underlies the difference between (*a*) tall (up to 30 feet), many leaved, extremely late maturing (up to 9–11 months) varieties from Central America, (*b*) the medium dent and flint types, about 15 feet tall, of moderate leaf number, taking about four months to mature, commonly grown in the U.S. Corn Belt and (*c*) the so-called early types like 'Golden Bantam,' etc., where the dwarfness (2 feet) suggested by the name is the direct result of the plant only having to produce a relatively few leaves before flowering (see (10) and (11) for further details of maize types). In none of these types is there any evidence that a change in the rate of leaf production is involved.

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* The reader familiar with the effects of illumination periods, will realise that consideration is purposely being limited to days of twenty-four hours since "laboratory days" of types like six hours' light, alternating continuously with one hour dark are not practicable on a horticultural scale. Again, he will also realize that there is a considerable lapse of time between the period when a leaf or inflorescence is initiated at the growing point and the time when it is seen *externally* as it pushes up from within the enclosing older leaves.

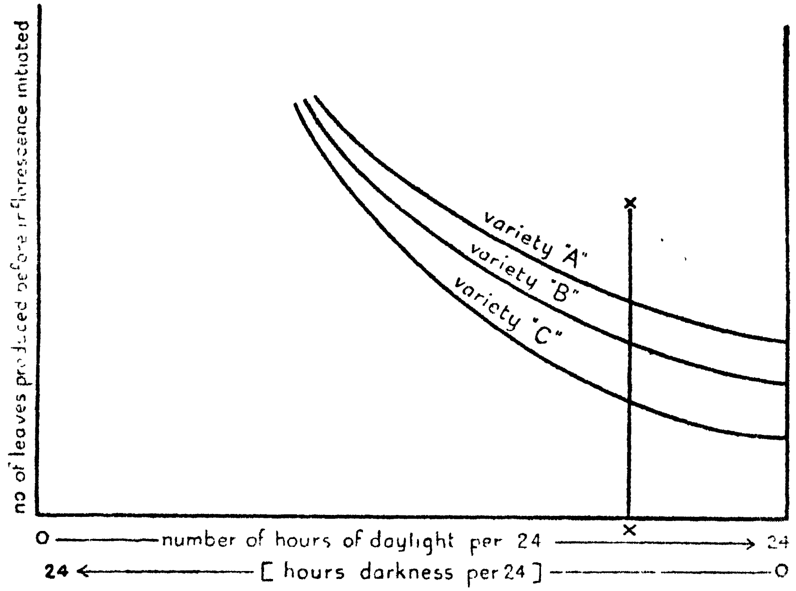

FIG. 2.

If, to simplify the problem, we take no account of the obvious occurrence of a number of intermediate types but merely consider the alternatives of " low versus moderate leaf numbers " and " short-day (long-night) demanding versus long-day tolerant," Fig. 3 (p. 200) will summarise the behaviour and serve as a useful background against which to plan cultivation of Maize in England.

Consider now a grower in the Home Counties: being well south with an early season, he can sow early and can probably grow any of

	Short-day (long-night) type	Long-day tolerant type
Moderate leaf number	Corn Belt types	? some Canadian types
Low leaf number	Golden Bantam, etc.	? Golden Cross and some Canadian types

FIG. 3.

the Bantam strains without much trouble because he is able to get his plants so far forward that they have initiated most of their leaves before the days lengthen and so reduce the rate of leaf production. Even when the hours of daylight are getting rather long, he does not have the disadvantage of a long twilight at each end of the day but still experiences a fair period of real night. He may grow his Bantams by planting directly out of doors and may even be able to grow some of the U.S. Corn Belt dents and flints in the same way. Not so his northern counterpart in say Lancashire, Yorkshire or Durham : with the later start in spring and the earlier onset of the limiting period of truly dark nights, he will find great difficulty in getting even the majority of the Bantams to have initiated many of their dozen or so leaves before there is considerable hindrance from lack of sufficient night. Nor can he easily improve matters by employing continuous greenhouse culture, for if sowing is late even plants of the Bantam type grown inside will only produce leaves slowly until the night length increases sufficiently after mid-summer, with the result that the plants still cannot be got into blossom until September ! This type of failure was experienced by many northern market gardeners during the last year or so of the war when they attempted to grow Sweet Corn instead of Cucumbers.

Ever since an early developmental study as a degree thesis the writer has been interested in the problem of a strain of Maize to grow in the north, and during the years 1941–44 small scale trials were carried out on samples of most of the types available through the larger British seedsmen, together with stocks not generally available to the public, coming mainly from University and Agricultural Research Stations in the United States and Canada. Over eighty different strains were grown, usually being sown directly into their permanent quarters (and purposely deprived of such aids as cloches, etc.). It was soon obvious that many of the well known types like 'Country Gentleman' were useless, whilst most of the strains of dwarfs, like the Bantams, etc., in spite of check all through the summer, could get their particular requirements of " night " early enough to initiate inflorescences in time for these to shed pollen and become fertilised before the first frosts of September. It was only rarely, however, that they would produce anything approaching useful cobs. The best kinds were a hybrid called '9 × M 13' from Minnesota, hybrids '255' and '275' from Wisconsin, the 'John Innes' hybrid Sweet Corn (now called 'Golden Cross') and 'North Western Red Dent' and 'Gehu' from Swift Current, Canada. Of these, hybrid '9 × M 13' (not available through normal channels) and 'John Innes' hybrid both have a low leaf number and both seemed to be able to tolerate the long days, giving the impression of steady continuous growth, though it is doubtful if either approach the Utopian ideal of a long-day Maize with a low leaf number!

From the practical point of view, a northern gardener must hurry through the early stages as fast as possible, choosing a strain like 'Golden Cross' or perhaps better still if it can be found, something with similar characteristics but of the dent or flint types because, although these do not have as high a quality for the table as Sweet Corn, their seedlings are more robust and develop faster. Careful attention must be paid to a number of seemingly small points so that every means is used to get as high a proportion of the leaves initiated as early as possible. The grains should be started at the earliest opportunity in the greenhouse, the seedlings being transplanted later after hardening off in a cold frame. Three or four grains should be planted to a large pot and the resulting two or three seedlings kept together as a "hill." Single large boxes for numbers of seedlings should not be used, as the disturbance at transplanting always checks the young plants. Clay soils should be avoided (as they only warm up slowly) even if this means planting out into holes filled with a good rich compost. Right from the start the plants should have generous feeding: although this will not reduce the *number* of leaves to be produced, there is overwhelming evidence that it has a considerable effect on the *rate* of leaf production (1). The writer likes to use a Tomato fertiliser or something of the Growmore 7-7-7 type: a nitrogenous manure alone is probably not advisable since, although it may produce rather impressive tall but sappy plants, the leaves are probably not being initiated as fast as they would be with a more balanced fertiliser. When the "hills" are planted out, cloches or similar appliances should be employed, and kept on as long as possible because a rise of only a few degrees makes an enormous difference to the rate of development at the low critical temperatures of spring. For the same reason, if the plants must be started in their permanent quarters, a strenuous effort should be made to provide any help that can be given in the way of cloches, etc.

Dr. DAWSON (2) need not fear that he has exaggerated the importance of frit fly, since an attack leads to the death of the main apex with the result that a precious ten days or a fortnight are lost in the production of tiller shoots to replace it. Professor G. E. BLACKMAN (in a letter 24/1/44) suggests the use of trap rows and borders of "Victory" oats: perhaps nowadays D.D.T. might afford protection.

In short, the whole plan must be to start as early as possible and push the plants along with all the speed the gardener's ingenuity and apparatus can give, because once the nights have become short nothing can be done to advance the plants towards their point of change over from the vegetative to the reproductive phase. Should he succeed in getting his plants there well before the critical date, the only detriment will be a slight reduction in yield, unless of course one regards early, out of season cobs as harmful!

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WISLEY TRIALS

EARLY FLOWERING CHRYSANTHEMUMS AT WISLEY, 1946

ONE hundred varieties were grown at Wisley in 1946; of these twenty-nine were grown for the first time, having been selected for trial in 1945 by the Joint Committee of the Royal Horticultural Society and the National Chrysanthemum Society.

All the varieties, including the new seedlings, were given the warm-water treatment as a precaution against Eelworm attack. We desire once again to draw the attention of all growers to the effectiveness of the warm-water treatment and consider that this should be one of the necessary routine operations of Chrysanthemum cultivation.

The rooted cuttings, three of each variety, were planted on a fresh site on April 26, 1946. The plants, were stopped once, some varieties were grown naturally, others were disbudded, one flower being allowed to develop on each main growth.

The report indicates the present state of the trials, showing those varieties retained for future judgment and those deleted from the trials, these latter being in the opinion of the Joint Committee to be now superseded.

The trial was inspected by the Joint Committee on August 27, September 11 and 25, 1946, who made their recommendations for Awards as given below.

FLOWERS WHITE

Millersdale (raised and sent by Messrs. J. & T. Johnson, Tibshelf, Derbys.). **A.M.** September 25, 1946, as a disbudded variety for cutting and garden decoration. 2½ feet. Plant of compact, erect habit, free flowering. Flower stems 18 to 22 inches long. Flowers double, 5½ inches diameter, pure white.

The following varieties have been retained for future judgment: CREAM BOUQUET (Shoesmith), SUCCESS (Vinten), MOONSTONE (Johnson), EDENSOR (Johnson), MARION (Shoesmith).

The following varieties have been deleted from the trials: ANGELA, CICERO, LETTICE, WHITE LADY (**A.M.** 1938).

FLOWERS CREAM

The following varieties have been retained for future judgment: CREAM FELICITY (Woolman), SHIRLEY CREAM (Woolman), VICTORIA (Shoesmith).

FLOWERS YELLOW

Imperial Yellow (raised and sent by Messrs. A. G. Vinten, Ltd., Oldland Nurseries, Balcombe, Sussex). **F.C.C.** September 25, 1946, as a disbudded variety for cutting and garden decoration.—Described R.H.S. JOURNAL, **69,** 208. (**A.M.** 1943.)

Mosquito (raised and sent by Mr. H. Shoesmith, Mayford, Woking, Surrey). **F.C.C.** September 11, 1946, as a spray pompon variety for garden decoration. Described R.H.S. JOURNAL, **71,** 49. (**A.M.** 1945.)

Golden Circle (raised and sent by Mr. H. Shoesmith, Mayford, Woking, Surrey). **A.M.** September 25, 1946, as a disbudded variety for cutting and garden decoration. 3 feet. Plant of compact, free flowering habit. Flower stems 24 inches long. Flowers double, incurved, 4½ inches, Aureolin (H.C.C. 3).

Flavius (raised and sent by Mr. H. Shoesmith, Mayford, Woking, Surrey). **H.C.** September 25, 1946, as a disbudded variety for cutting and garden decoration. 2½ feet. Plant of compact, erect, free flowering habit with 12 inches long flowering stems. Flowers double, 5 inches diameter, Canary-yellow (H.C.C. 2/2), in bud tinged reddish-bronze.

The following varieties have been deleted from the trials: BUTTERGLOW (**A.M.** 1939), HARVEST MOON (**H.C.** 1939), HERBERT SUTCLIFFE (**A.M.** 1939), SHIRLEY YELLOW.

FLOWERS AMBER

Radar (raised and sent by Messrs. J. & T. Johnson, Tibshelf, Derbys.). **A.M.** September 25, 1946, as a disbudded variety for cutting and garden decoration.—2¾ feet. Plants of compact, erect, free flowering habit. Flower stems 18 to 22 inches long. Flowers double, 5 inches diameter, Saffron-Yellow (H.C.C. 7).

The following variety has been retained for future judgment: TREASURE (Maher).

The following varieties have been deleted from the trials: AUGUST GLORY, HARMONIOUS (**A.M.** 1938), ORANGE GEM.

FLOWERS OF PINK SHADES

Bo-Peep (raised and sent by Messrs. J. & T. Johnson, Tibshelf, Derbys.). **A.M.** September 25, 1946, as a spray pompon variety for garden decoration. 2 feet. Plant of compact, bushy habit. Flowers double, 1½ inch diameter, outer florets Camellia Rose (H.C.C. 622/3), inner tipped with reddish-bronze.

Fair Maid (raised and sent by Messrs. J. & T. Johnson, Tibshelf, Derbys.). **A.M.** September 11, 1946, as a disbudded variety for cutting and garden decoration. 2½ feet. Plant of compact, free flowering habit. Flower stems 18 to 24 inches long. Flowers double, 5 inches diameter, Amaranth Rose (H.C.C. 530/2).

Salmon Sweetheart (raised and sent by Messrs. J. & E. Maher, Carisbrooke Nurseries, South Road, Hampton, Middlx.). **A.M.** August 27, 1946, as a disbudded variety for cutting and garden decoration, Character of 'Sweetheart' from which it is a "sport" with Rose-pink flowers (H.C.C. 427/1), reverse of florets golden-yellow.

Shell Bouquet (raised and sent by Mr. H. Shoesmith, Mayford, Woking, Surrey). **A.M.** September 25, 1946, as a spray pompon variety for garden decoration. 2½ feet. Plants of compact habit. Flowers double, 2 inches diameter, cream faintly tinged Venetian Pink (H.C.C. 420/3), inner florets tipped golden-yellow.

The following varieties have been retained for future judgment: DAY DREAM (Johnson), DIANE (Johnson), HYDE (Hyde), MADELINE (Johnson).

The following variety has been deleted from the trials: CRESSINGTON.

FLOWERS OF ROSE SHADES

Dorothy Speat (raised and sent by Mr. H. Shoesmith, Mayford, Woking). **A.M.** September 25, 1946, as a disbudded variety for cutting and garden decoration. 2 feet. Plant of compact habit. Flower stems 14 to 18 inches long. Flowers double, 4½ inches diameter, Apricot overlaid with Roseine Purple (H.C.C. 629/2).

The following varieties have been retained for future judgment: FREDA PEARCE (Shoesmith), ROSE BOUQUET (Woolman).

The following varieties have been deleted from the trials: ALTHORPE (A.M. 1938), CAESAR (A.M. 1943).

FLOWERS OF SALMON SHADES

Egerton Sweetheart (raised and sent by Mr. G. Lamb, Egerton Nursery, Hextable, Swanley, Kent). **A.M.** August 27, 1946, as a disbudded variety for cutting and garden decoration. Characters of 'Sweetheart' from which it is a "sport." Flowers double, 4½ inches diameter, rosy-salmon shaded gold on reverse of the florets.

FLOWERS OF ORANGE-BRONZE SHADES

Arnhem (raised and sent by Messrs. J. & T. Johnson, Tibshelf, Derbys.). **A.M.** September 25, 1946, as a disbudded variety for cutting and garden decoration. 2½ feet. Plant of erect habit, with 20–26 inch long flower stems. Flowers double, 4¾ inches diameter, deep orange-bronze.

Firedrake (raised and sent by Messrs. J. & T. Johnson, Tibshelf, Derbys.). **A.M.** September 11, 1946, as a disbudded variety for cutting and garden decoration. 2½ feet. Plant of compact habit. Flower stems 1½ to 2 feet long. Flowers double, 4 inches diameter, Persimmon Orange (H.C.C. 710/2) shaded reddish-bronze with a golden reverse.

The following variety has been retained for future judgment: OCEANIC (Woolman).

The following varieties have been deleted from the trials: SPARTAN (**A.M.** 1940), TERRA-COTTA FREDA (**A.M.** 1939).

FLOWERS OF BRONZE SHADES

Tiny Tot (raised and sent by Mr. H. Shoesmith, Mayford, Woking, Surrey). **A.M.** September 25, 1946, as a spray pompon variety for garden decoration. 2 feet. Plant of compact, bushy habit. Flowers double, 1 inch diameter, Aureolin (H.C.C. 3/1) overlaid with crimson, the tips and margins of the florets clear yellow, the whole giving a bronze effect.

The following variety has been deleted from the trials: CHAMOIS (**A.M.** 1942).

FLOWERS RED-BRONZE

Red Sweetheart (raised by Mr. George Shepherd, Holme Lane Corn & Seed Stores, Sheffield, and sent by Messrs. J. & T. Johnson, Tibshelf, Derbys.). **A.M.** August 27, 1946, as a disbudded variety for cutting and garden decoration—a " sport " from ' Sweetheart,' with reddish-bronze shaded gold flowers.

The following variety has been retained for future judgment: BUBBLES (Johnson).

The following varieties have been deleted from the trials: EASTMOOR RED, LAPWORTH.

FLOWERS OF RED SHADES

August Red (raised and sent by Messrs. J. & T. Johnson, Tibshelf, Derbys.). **A.M.** September 11, 1946, as a disbudded variety for cutting and garden decoration. 2½ feet. Plant of compact, free flowering habit. Flower stems 18 to 22 inches long. Flowers double 4½ inches diameter, Brick Red (H.C.C. 016) with a golden reverse to the florets.

Sparkler (raised and sent by Messrs. J. & T. Johnson, Tibshelf, Derbys.). **A.M.** September 11, 1946, as a disbudded variety for cutting and garden decoration. 2½ feet. Plant of compact free flowering habit. Flower stems 1½ to 2 feet long. Flowers double, 3¾ inches diameter, Blood Red (H.C.C. 820/1), reverse of florets gold.

FLOWERS RUBY-RED

Ronald (raised and sent by Mr. H. Shoesmith, Mayford, Woking, Surrey). **F.C.C.** as a disbudded variety for cutting and garden decoration. Described R.H.S. JOURNAL, **71,** 51 (**A.M.** 1945).

FLOWERS PURPLE

The following variety has been retained for future judgment: JOAN FELLOWES (Woolman).

BORDER CARNATIONS AT WISLEY, 1945-46

SEVENTY-SEVEN varieties of Hardy Border Carnations were grown at Wisley during 1945 and 1946; of these thirty-eight were grown for the first time, the remainder being those which had been retained for future judgment and the standard varieties, against which the new additions to the trials are tested.

The plants were planted, five of each variety, on March 28, 1945, and were inspected by the Joint Committee of the Royal Horticultural Society and the National Carnation and Picotee Society and allowed to remain during the following winter, being finally judged on July 18, 1946, by the Joint Committee, who made their recommendations for Awards as given below.

WHITE SELFS

Blanchefleur (sent by Messrs. Allwood Bros., Ltd., Wivelsfield Nurseries, Haywards Heath, Sussex). **H.C.** July 18, 1946. 23 inches. Plant of bushy habit; flower stems rigid. Flowers 2⅞ inches diameter, rather open centre, white, petals broad, entire; calyx strong.

The following variety is retained for future judgement: EDENSIDE WHITE.

YELLOW SELFS

The following varieties have been retained for future judgment: ALEX. FAULDS, GOLDEN DUSTMAN.

APRICOT SELFS

The following variety has been retained for future judgment: MRS. A. KEMBLE.

PINK SELFS

The following varieties have been retained for future judgment: COTTAGE ROSE, COTTAGE WONDER, EDENSIDE PINK, DORA SPENLOW, FORTROSE.

OLD ROSE

The following varieties have been retained for future judgment: BELLE OF BOOKHAM, HARRIET HARROW.

SCARLET SELFS

The following varieties have been retained for future judgment: BOOKHAM CLOVE IMPROVED, W. B. CRANFIELD.

RUBY SELFS

The following varieties have been retained for future judgment: COTTAGE CLARET, COTTAGE RUBY.

MAUVE SELFS

The following varieties have been retained for future judgment: HERON, SOUTHERN MIST.

FANCIES

Leslie Rennison (raised by the late R. Thain and sent by W. G. Ferris, Esq., Woodhurst, High Warren, East Horsley, Surrey). **H.C.** July 18, 1946. 20 inches. Plant of bushy habit, flower stems short, rigid; flowers 2 inches diameter, full centre, Pansy Purple (H.C.C. 033/2) overlaid with Rose Bengal (H.C.C. 25/2); petals broad; entire; calyx strong.

The following varieties have been retained for future judgment: AFTON WATER, COTTAGE GEM, COTTAGE JEWEL, MARY LIVINGSTON.

WHITE GROUND FANCIES

Robin Thain (raised and sent by the late R. Thain). **F.C.C.** July 18, 1946. Described JOURNAL R.H.S., **69,** 29 (**A.M.** 1943).

Jean Milton (raised and sent by W. G. Ferris, Esq., Woodhurst, High Warren, East Horsley, Surrey). **A.M.** July 18, 1946. 2 feet. Plants rather spreading habit, flower stems strong and rigid ; flowers 2½ inches diameter, full centred, white edged and pencilled with Geranium Lake (H.C.C. 20/1) ; petals broad, entire ; calyx strong.

Lucy Bertham (raised by Mr. James Douglas and sent by W. G. Ferris, Esq., Woodhurst, High Warren, East Horsley, Surrey). **A.M.** July 18, 1946. 2 feet. Plants vigorous, bushy habit ; flower stems strong, rigid ; flowers 2½ inches diameter, double, rather open centred, very free, white edged and striped Cherry Red (H.C.C. 23) ; petals broad, entire ; calyx strong.

The following varieties have been retained for future judgment: AILSA CLOVE, BOOKHAM CLOVE, MARY CARMICHAEL, MURIEL HAWTIN, ROBERT ADDISON.

YELLOW GROUND FANCIES

The following varieties have been retained for future judgment: BOOKHAM FAVOURITE, CATHERINE GLOVER, CARNOCK TRIUMPH, DAVID DOUGLAS, EMMA KIRKWOOD, FASCINATION, R. M. GRIER.

PICOTEES

Ganymede (raised by Mr. James Douglas and sent by Messrs. Allwood Bros., Ltd., Wivelsfield, Nurseries, Haywards Heath, Sussex). **A.M.** July 18, 1946. 20 inches. Plant vigorous, bushy habit ; flower stems strong, rigid ; flowers double, 2½ inches diameter, centre open, white-edged Indian Lake (H.C.C. 826) ; petals broad, entire ; calyx strong.

Patrick (raised and sent by James Fairlie, Esq., 17, Mayfield Road, Acton, London, W. 3). **A.M.** July 18, 1946. Described JOURNAL R.H.S., **69,** 30 (**H.C.** 1943).

The following varieties have been retained for future judgment: MRS. J. J. KEEN, PERFECTION, SILAS OSBALDISTON, TOGO.

GARDEN PINKS AT WISLEY, 1946

FORTY-NINE varieties of Garden Pinks were sent for trial to Wisley in 1945, five plants of each variety were planted on March 29, 1945, and the plants were not allowed to flower during the summer. All made good growth and flowered freely in 1946.

Judging from the varieties in the trial, there is room for improvement, in the habit of the plants and ample scope for raisers to introduce varieties with a " cushion " habit, in place of the spreading or straggling habit which is prevalent in most of the present-day varieties.

The trial was inspected by the Joint Committee of the Royal Horticultural Society, the British Carnation Society and the National Carnation and Picotee Society on June 12, 1946, who made their recommendations for Awards as given below.

FLOWERS WHITE

Musgrave's Pink (introduced by Charles T. Musgrave, Esq., V.M.H., and sent by Messrs. Allwood Bros., Ltd., Wivelsfield Nurseries, Haywards Heath, Sussex). **A.M.** June 12, 1946. Plant of compact, bushy habit; flower stems rigid, erect; flowers single, 1¾ inches diameter, white zoned Uranium Green (H.C.C. 63/2), scented; petals broad, cut; calyx strong.

The following varieties have been retained for future judgment: ALLWOODII HAROLD, FRIMBRIATA, HER MAJESTY, MRS. SINKINS, OLD FRINGED, WHITE LADIES.

The following varieties have been deleted from the trials: RUTH LANDSELL, SNOWDRIFT.

FLOWERS WHITE, ZONED A DARKER COLOUR

Sam Barlow (sent by Messrs. Allwood Bros., Ltd., Wivelsfield Nurseries, Haywards Heath, Sussex). **A.M.** June 12, 1946. Plant very vigorous, compact, bushy habit; flower stems stout, rigid; flowers double, 2 inches diameter, white zoned Pansy Purple (H.C.C. 928/2); calyx weak. (**A.M.** 1933.)

The following varieties have been retained for future judgment: ALLWOODII ALICE, ALLWOODII BETTY, ALLWOODII JEAN, DAD'S FAVOURITE, MURRAY'S LACED PINK, PRINCESS CHRISTIAN.

FLOWERS PINK SELFS

Inchmery (sent by Messrs. Allwood Bros., Ltd., Wivelsfield Nurseries, Haywards Heath, Sussex). **A.M.** June 12, 1946. Plant of vigorous, bushy habit; flower stems stout, rigid; flowers double, open centre, flat, 1½ inches diameter; Amaranth Rose (H.C.C. 530/1 to 530/2), very free flowering; petals broad; calyx strong (**H.C.** 1925).

Ovingdean (raised by Mr. L. H. Cox and sent by the Chez Nous Nurseries, Newick, Sussex). **A.M.** June 12, 1946. Plant of compact, bushy, vigorous habit; flower stems stiff, erect, 12–15 inches long; flowers double, flat; open centre, 1¼ inches diameter, Phlox Pink (H.C.C. between 625 and 625/1) very slighty zoned Rose Bengal (H.C.C. 25); petals broad, fringed; calyx strong.

Allwoodii Freda (raised and sent by Messrs. Allwood Bros., Ltd., Wivelsfield Nurseries, Haywards Heath, Sussex). **H.C.** June 12, 1946. Plant of compact, bushy habit; flower stems rigid, 12–14 inches long; flowers double, 2 inches diameter, Mallow Purple (H.C.C. between 630 and 630/1); petals broad, cut; calyx strong; very free flowering.

The following varieties have been retained for future judgment: ALLWOODII AMY, ALLWOODII BRIDGET, ALLWOODII PETER, ALLWOODII MONTY, DUSKY, EARL OF ESSEX, NEWHAVEN.

The following varieties have been deleted from the trials: ALLWOODII JAMES, ALLWOODII ROBIN.

FLOWERS PINK, ZONED A DARKER COLOUR

Allwoodii Denny (raised and sent by Messrs. Allwood Bros., Ltd., Wivelsfield Nurseries, Haywards Heath, Sussex). **A.M.** June 12, 1946. Plant vigorous, of very compact, bushy, very free flowering habit; flower stems stiff, erect; flowers single, 2½ inches diameter, Rhodamine Pink (H.C.C. 527/2), zoned Chrysanthemum Crimson (H.C.C. 824/1), petals flat; very broad, cut; calyx strong.

Paddington (raised by the late T. Hogg of Paddington Green and sent by Messrs. Allwood Bros., Ltd., Wivelsfield Nurseries, Haywards Heath, Sussex). **A.M.** June 12, 1946. Plant vigorous, bushy habit; flower stems rigid; flowers double, 1½ inches diameter, very freely borne, Amaranth Rose (H.C.C. 530), zone Pansy Purple (H.C.C. 928/3); petals narrow, fringed; calyx weak.

The following varieties have been retained for future judgment: ALLWOODII JOAN, ALLWOODII ESTHER, ALLWOODII MOLLY, ALLWOODII ROBERT, ALLWOODII SUSAN, PINK MRS. SINKINS, ROI DE MAI, VILLAGE PINKS.

The following varieties have been deleted from the trials: ALLWOODII GLORIA, ALLWOODII PAMELA, ALLWOODII MARY, ALLWOODII RICHARD, ALLWOODII WAVED FLOWERED.

FLOWERS OF CRIMSON SHADES

Allwoodii Reggie (raised and sent by Messrs. Allwood Bros., Ltd., Wivelsfield Nurseries, Haywards Heath, Sussex). **A.M.** June 12, 1946. Plant compact, bushy habit; flower stems stout, rigid; flowers double, 1¾ inches diameter, full centred, Cardinal Red (H.C.C. 822/2) zoned at base of petals Oxblood Red (H.C.C. 00823/2); petals broad, cut; calyx strong.

The following varieties have been retained for future judgment: CUCKFIELD, ALLWOODII THOMAS, ALLWOODII RUTH, ALWOODII WINSTON.

The following varieties have been deleted from the trials: ALLWOODII IAN.

ESCHSCHOLZIAS AT WISLEY, 1946

FOURTEEN stocks of Eschscholzias were received at Wisley for trial in 1946. These were sown directly in the open ground, in rows 1½ feet apart on May 1, 1946, and the resulting seedlings thinned to 8 to 9 inches apart in the rows. All made growth and in spite of the unfavourable season grew and flowered well.

The plants were inspected by a sub-committee of Floral 'A' Committee on July 25, 1946, who made their recommendations for awards as given below.

FLOWERS OF YELLOW SHADES

The following varieties were grown in the trials: E. PULCHELLA (Ferry-Morse Seed Co.); CREAMY CRINKLES (W. Atlee Burpee & Co.); DELIGHTFUL (W. Atlee Burpee & Co.); HARVEST GOLD (W. Atlee Burpee & Co.); MOONLIGHT (Watkins & Simpson, Ltd.); SUNBEAM (W. Atlee Burpee & Co.).

FLOWERS OF ORANGE SHADES

Crocea Flore Pleno Improved (raised and sent by Messrs. Watkins and Simpson, Ltd., 27 Drury Lane, Covent Garden, London, W.C. 2). **H.C.** July 25, 1946. Plant of compact habit, free-flowering; flowers semi-double, 2½ inches diameter, petals fluted, a very bright shade of Cadmium-orange (H.C.C. 8) shaded with Tangerine-orange (H.C.C. 9).

Robert Gardiner (raised by Mr. W. H. Gardiner, introduced by Messrs. Carters Tested Seeds, Ltd., and sent by Messrs. Watkins and Simpson, Ltd., 27 Drury Lane, Covent Garden, London, W.C. 2).

C. July 25, 1946. Plant of compact habit, very free-flowering; flowers semi-double, many single, 3 inches diameter, petals corrugated, a bright shade of Cadmium-orange (H.C.C. 8) suffused with Tangerine-orange (H.C.C. 9).

The following varieties were grown in the trials: DOUBLE ORANGE and FIREGLOW as control varieties.

FLOWERS OF ORANGE-TINGED PINK SHADES

The following varieties were grown in the trials: AURORA, as a control variety; MY FAVOURITE (W. Atlee Burpee & Co.); SWEETHEART (W. Atlee Burpee & Co.).

FLOWERS OF ROSE SHADES

The following varieties were grown in the trials: CARMINE KING IMPROVED (Watkins & Simpson, Ltd.); ROSE DAWN (W. Atlee Burpee & Co.); ROSY QUEEN, as a control variety.

FLOWERS OF RED SHADES

The following varieties were grown in the trials: FLAME and RED CHIEF as control varieties; FLAMBEAU (Watkins & Simpson, Ltd.).

SPINACH AT WISLEY, 1946

SIX stocks of Spinach were received at Wisley for trial. These were sown on July 31, 1946, in rows, 18 inches apart. All the varieties germinated well and good crops were secured.

The trial was inspected by a Sub-Committee of the Fruit and Vegetable Committee, which made their final decisions and recommendations for Awards on October 9, 1946, as given below.

SEEDS ROUND

Leaves blistered, Savoy-like

Standwell Round (Bunting), closely resembling Bloomsdale Savoy.

Leaves Plain

Norman 'Cobea' (raised and sent by Messrs. Corns van Beusekom, Bussum, Holland). **A.M.** October 9, 1946.—Vigorous, 9 inches tall, 20 inches wide, spreading habit with very broad medium to dark green glossy, hastate blades, with blunt tips and flat margins; slow to run to seed. A good even stock.

Reliance (introduced and sent by Messrs. Watkins & Simpson, Ltd., 27, Drury Lane, Covent Garden, London, W.C. 2). **A.M.** October 9, 1946.—Vigorous, 9 inches tall and 18 inches across, erect spreading habit with very broad, fleshy medium to dark green, glossy, hastate leaves, a shade paler than 'Norman Cobea,' with almost smooth blades, tips blunt, margins flat; slow to run to seed. A good even stock.

SEEDS PRICKLY

Leaves Plain

Advance (raised, introduced and sent by Messrs. A. R. Zwaan & Son, Voorburg, Holland). **A.M.** October 9, 1946.—Vigorous, 8 inches tall, 22 inches wide; erect, rosette habit; leaves broad, hastate, fleshy, smooth, dark glossy green, tips rounded, margins flat; very slow to run to seed. A good even stock.

Giant Leaved Prickly (selected, introduced and sent by Messrs. Watkins & Simpson, Ltd., 27, Drury Lane, Covent Garden, London, W.C. 2). **A.M.** October 9, 1946.—Vigorous, 9 inches tall, 22 inches wide, fast growing, of erect spreading habit; leaves very broad hastate, medium green, almost smooth with blunt tips and flat margins, very slow to run to seed. A good even stock.

The following variety was grown and belongs here; STANDWELL PRICKLY (Bunting).

PLANTS TO WHICH AWARDS HAVE BEEN MADE IN 1946

Daphne Bholua. **A.M.** December 3, 1946. An uncommon and extremely attractive Himalayan species, which forms a small, evergreen bush. The oblanceolate leaves are 2½ inches long, thinly coriaceous, dark green above and paler beneath. The sweetly-scented flowers, each nearly ¾ inch across, are blush-coloured, flushed externally with rose, and are developed six or seven together in terminal clusters. Exhibited by Mrs. M. W. Stoker, The Summit, Loughton, Essex. (See p. xxx.)

Sorbus pohuashanensis. **A.M.** September 24, 1946. An attractive Mountain Ash, discovered in Northern China in 1874 and first introduced to cultivation in this country in 1901. The long specific name is derived from Po-hua-shan, the "Mountain of Flowers," where it was found. The leaves are 8 or 9 inches long, with usually 13 or 15 lanceolate, sharply serrate leaflets, varying from 1½ to 2½ inches long. The white, Hawthorn-scented flowers, appearing in May are followed by conspicuous bunches of large, globose, Nasturtium-red (H.C.C. 14) berries which begin to colour in mid-August. Exhibited by the Director, R.H.S. Gardens, Wisley. (See p. iii.)

BOOK REVIEWS

"The Study of Cacti." By Vera Higgins. Demy 8vo. 144 pp. Illustrated. Second Edition. (Blandford Press.) 10*s.* 6*d.*

This book remains the standard small work in English on the Cacti, and a new edition is most welcome. Mrs. Higgins, in her Preface, refers to the many new genera proposed by German workers, but wisely feels that the time has not yet come when all these should be accepted, and that a conservative view seems desirable at the present time, as further work may possibly show that the tendency to sub-division has been overdone. We would like to endorse this feeling and to recommend most strongly this book, based on the classification of Britton and Rose, to all those interested in the cultivation of this fascinating group. It is clear on classification, and practical and helpful on cultivation. There is a most interesting chapter dealing with the historical record which goes back beyond Gerarde. Of the 'Hedgehog Thistle,' now known as the 'Turk's Cap,' from the West Indies, Gerarde says: "Who can but marvell at the rare and singular Workmanship which the Lord God Almightie hath shewed us in this thistle." This is the right spirit in which to cultivate Cacti, a group which seems to present more interesting adaptations to environment than almost any other group of plants. As Sir William Lawrence wrote in his preface to the first edition: "We have a model monograph, classification, cultivation, country of origin and history are dealt with faithfully and concisely." The second edition is even better.

P. M. S.

"Camellias in America." By H. Harold Hume. 350 + xvi pp. 49 plates in colour, 46 full-page black and white plates, and 18 line-drawings in the text. (Harrisburg, Pennsylvania, J. Horace McFarland Co., 1946.) $25.50.

The title of this book is certainly apposite, for the greater part of it is devoted to the Camellias in cultivation in the U.S.A.—the Camellias being almost exclusively varieties of *Camellia japonica*. The treatment of the subject is very comprehensive. The first part, some 60 pages, is historical; it tells where and under what conditions Camellias grow in nature, how knowledge of the plants, and later the plants themselves, came to Europe, and concludes with an account of their history in America. Part II, 56 pages, is botanical, and deals briefly with the position of the genus, the species of *Camellia* in cultivation, some of the related genera represented in gardens, the structure of *Camellia* flowers and how double flowers are formed, the development of flower-buds, the life-history and growth periods of the Camellia plant, and finally breeding. The third part, of 93 pages, is mainly concerned with cultivation, but includes chapters on the use of plants in the garden, exhibiting, and the packing and transport of flowers. In the last part of the book the naming, classification, appreciation, and selection of varieties is dealt with; there is also an excellent account of the chief books and articles dealing with Camellias, and finally a list of varieties available in America, together with the sources from which they may be obtained.

Much the greater part of the book is based on the author's own experience and observations. Dr. Hume is Provost and Dean of the College of Agriculture in the University of Florida, and is one of the leading horticulturists in the southern States. He has been growing and studying Camellias for over 30 years, and his book bears witness to the rich store of knowledge he has accumulated. The writing is admirably lucid, and the matter is presented in a refreshingly simple and straightforward manner. One particularly pleasing feature is that directions for the growing and care of the plants etc., are accompanied by reasons for the advice. Whilst much of the information is applicable in general, it must not be forgotten that the book is designed for Americans, and consequently parts of it are of little interest or use outside America. Next to *C. japonica*, *C. Sasanqua* and *C. sinensis* appear to be the most widely grown Camellias in the United States. *C. reticulata* seems to be relatively little known, *C. saluenensis* and *C. cuspidata* are scarcely known at all, whilst *C. maliflora* and the interspecific hybrids developed in this country during late years are apparently quite unknown.

The colour plates are half-tone reproductions of colour photographs, and they suffer from the limitations of the method of reproduction—namely that the colour of the leaves is not rendered at all satisfactorily. Moreover, coloured backgrounds are used, and whilst some of these are innocuous or even pleasing, others detract considerably from the beauty of the plates, and in some cases, for example, the picture of 'Kimberley,' p. 165, the result is most unfortunate. In general the flower-colour seems to be reasonably faithful, but the poor representation of the leaves in conjunction with the background often results in a figure which does not do justice to the subject. Most plates show the flower natural size, but the illustration of *C. reticulata*, p. 327, is considerably reduced and does not give a very good idea of this most magnificent of all Camellias.

Whilst the author's style is not at all heavy, his book most decidedly is so. It weighs almost 4 lb. (due chiefly to the heavily loaded paper) and cannot be read in comfort unless placed on a support.

The book can be warmly recommended to anyone interested in growing Camellias, whilst it should prove a useful work of reference to all who may have to deal with the genus.

J. R. S.

"Rapid Tomato Ripening." By L. D. Hills and E. H. Haywood. 8vo. 143 pp. (Faber and Faber, London, 1946.) 8*s*. 6*d*.

The authors of this book advocate picking Tomatoes in a green state, particularly during the early part of the season when supplies of ripe fruit are limited, and ripening them by artificial means. A rosy picture is painted of the profits to be gained by this practice under the present conditions of shortage and controls.

C. R. F.

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THE SECRETARY'S PAGE

Programme of Meetings.—Meetings and Shows during the months of June and July will be held on the following dates :—

Tuesday, June 3—12 noon to 6 P.M.
Wednesday, June 4—10 A.M. to 5 P.M.
Tuesday, June 17—12 noon to 6 P.M.
Wednesday, June 18—10 A.M. to 5 P.M.
Tuesday, July 1—12 noon to 6 P.M.
Wednesday, July 2—10 A.M. to 5 P.M.
Tuesday, July 15—12 noon to 6 P.M.
Wednesday, July 16—10 A.M. to 5 P.M.
Tuesday, July 29—12 noon to 6 P.M.
Wednesday, July 30—10 A.M. to 5 P.M.

On June 17 and 18 there will be a Flowering Tree and Shrub Competition for Amateurs. The Summer Fruit and Vegetable Show and the Clay Cup Competition for a New Scented Rose will be held in conjunction with the Show on July 15 and 16. On July 29 and 30 there will be a Hardy Flower Competition for Amateurs. Particulars and Schedules of all these competitions may be obtained on application to The Secretary, Royal Horticultural Society, Vincent Square, Westminster, S.W. 1.

At the Show on June 17 and 18 the National Carnation and Picotee Society will hold a Pink Competition. The Schedule may be obtained from Mr. C. F. WELLSTED, Hon. Secretary, National Carnation and Picotee Society, 162 Tilney Road, Dagenham, Essex.

Lectures.—On Tuesday, June 3, at 3 P.M. in the Lecture Room, New Hall, the first of the two annual Masters Memorial Lectures will be delivered by Dr. T. SWARBRICK, who will take as his subject, "Plant Hormones and their Relation to Horticulture." On Tuesday, June 17, Mr. M. HAWORTH-BOOTH will lecture on "Choice Shrubs," and there will be a lecture entitled "Nomocharis" given by Mr. D. WILKIE on Tuesday, July 1. Both these lectures will be held at 3 P.M. in the Lecture Room.

Demonstrations at Wisley.—The following demonstrations will be held at Wisley during June and July, that on the second day being a repetition of the demonstration given on the first :—

Flower Garden

Wednesday and Thursday, June 4 and 5.—Summer Pruning of Shrubs (2–4 P.M.).

Fruit Garden.

Wednesday and Thursday, July 9 and 10.—Summer Pruning of Fruit Trees (2–4 P.M.).

Kindred Societies' Shows.—According to present arrangements, on Tuesday, June 24, the National Sweet Pea Society will hold a Show in the Old Hall, and the British Delphinium Society will be holding one in the New Hall. Fellows' tickets will admit to both these Shows, but not to the National Rose Society's Show, which will take place on Friday, June 27, in both Halls. The National Carnation and Picotee Society will hold a Show in the Old Hall on Tuesday and Wednesday, July 15 and 16, to which Fellows' tickets will admit. At the time of going to press there is a possibility that the Sweet Pea and Rose Shows may have to be postponed.

"Evening News" Flower and Vegetable Show.—The *Evening News* will hold a Flower and Vegetable Show in the Society's Old and New Halls on Friday and Saturday, July 4 and 5, the price of admission to which will be 1*s.* 9*d.* on both days.

Colorado Beetle.—The Ministry of Agriculture and Fisheries asks that notice may be drawn to the danger of the Colorado Beetle establishing itself in this country. The beetle was found in 25 separate places in this country in 1946, and in view of the likelihood of further outbreaks in 1947 the need for vigilance is greater than ever since it is of the utmost importance that any outbreaks should be dealt with by the Ministry before the pest has time to spread or multiply. The Ministry is accordingly anxious to obtain as early notification as possible of the discovery of the pest in this country.

WISLEY IN JUNE

FOLLOWING the severe weather of the winter which delayed the flowering of many subjects, many of our earliest flowering shrubs gave a very creditable display well into April. Little damage was caused by night frosts to such subjects as *Rhododendron praecox* planted in thin woodlands, while other Rhododendrons suffered severe damage to their buds during the winter and will produce few or no flowers this spring.

The many varieties of Forsythia once again produced a great display of flower, and they must be reckoned amongst our most reliable and showy spring flowering shrubs.

By this month most of the leeway in the flowering of trees and shrubs will have disappeared and only the vacant places of those that perished during the intense cold will remind us of the severe weather all endured. The latest attempts at revival, by producing basal growths from below or at ground level may occur as late as this month, but such subjects take many years before they are fully recovered and a second hard winter is generally more than they can survive.

June will show a great wealth of flowers in all parts of the Gardens, with many new features in the trials of herbaceous perennials planted below the Rose Walk, while the Rock Garden, Wild Garden and Seven Acres will also have a wealth of blossom to display.

Those whose visit will permit a full inspection of the Garden, should commence with Battleston Hill, where the well-established collection of hybrid Rhododendrons, over planted with specimens of Acers and Sorbus, are reaching the peak of their display. Above these the hybrid Azaleas now in new quarters will be in full flower with the new beds of Rhododendron species occupying the crown of the hill. Over the bridge a new path running along the bottom of the dell planted with the extremely large leaved species of the *Rhododendron fictolacteum* type has been constructed, and for those who do not wish to descend a view-point with a seat has been provided at the farther end. This dell, mainly replanted during the autumn, will, it is hoped, become a feature of the Gardens in the future.

Returning from the hill we pass the trial of Delphiniums, and a little further on those of Lupins and bearded Iris. All will be flowering now, and any visitor wishing to make a selection for planting next spring will probably find these planted trials more instructive than the massed effects provided on the show bench.

Ascending towards the Alpine House we pass to two long borders forming the Rose Walk ; here are collected many Roses, both old and new, the polyantha type being particularly numerous, and although they are far from being a trial of the most up-to-date varieties these beds contain a selection which may be taken as a guide by Fellows, especially as the soil at Wisley is of a type far from ideal for Rose growing, and varieties which thrive here should show increased vigour on a more favourable soil.

In the Alpine House the earlier display of Saxifragas will have given way to a greater number of genera, chief amongst these will be Campanulas, Dianthus and Lewisias.

Campanula bellidifolia, C. petrophila and *C.* × *kewensis*, will be flowering this month, with the long arching sprays of *Saxifraga Cotyledon* and its varieties, forming a pleasing background to the striped flowers of *Lewisia Heckneri.* Other interesting plants will include the silver-leafed *Lupinus nanus*, and the slow growing *Phyteuma comosum.*

Surrounding the Alpine House will be found the collection of Cistus and Helianthemums, both of which have suffered from the winter, but a bright display will be starting again this month. Both are useful plants for dry sandy soils, but reserve stock should always be propagated as old age especially with the Cistus appears to increase their susceptibility to frost damage.

Before passing into the Rock Garden a brief visit should be paid to the collection of herbaceous Paeonies planted in the border between the old Pear collection and the top of the Alpine Meadow.

The many alpines in bloom make the Rock Garden the chief attraction to visitors during this month, many Dianthus will be in full flower, particularly the neat tufts of *Dianthus caesius*, and *D. arvernensis* and the many hybrids with flowers of all shades of red, pink and white. Other conspicuous plants include *Papaver alpinum*, *Meconopsis quintuplinervia* with nodding lavender bells, the brilliant scarlet of *Verbena chamaedryfolia*, and the yellow flower-head and silvered foliage of *Achillea clypeolata*, while near the pond the various forms of Mimulus grow luxuriantly with the moisture-loving *Iris pseudacorus* and *I. versicolor* soon to be followed in flower by the many beautiful varieties of *I. Kaempferi*.

The Wild Garden offers cool shade after the open sunlight of the Rock Garden and many trees and shrubs will be flowering here, with the damp ditches and depressions a mass of Candelabra Primulas, *Primula japonica*, *P. pulverulenta*, *P.* × 'Red Hugh' and the yellow *P. helodoxa* to mention only a few. The first Lilies will also be in flower later this month and these include *Lilium rubellum* with rose-pink flowers, *L. Szovitsianum* having solid yellow turkscap blooms, and the easily grown reddish flowered *L. umbellatum*.

Styrax japonicum forms a small tree hung with pendent white flowers, and the Rhododendrons are represented by *R. azaleoides* a lilac-coloured hybrid of unknown parentage, and the deciduous *R. viscosum* and *R. arborescens*, while *Magnolia Watsonii* and *M. Sieboldii* will still be in flower, soon to be followed by the smaller blooms of the half evergreen *M. virginiana* a small tree or shrub which if not so showy as some of the species has a definitely longer flowering season.

Seven Acres will have many shrubs to show in flower, Philadelphus, Deutzias, and Spiraea, and amongst the Ericas will be found the heath-like sprays of *Bruckenthalia spiculifolia* and the pink and whiteflowers of the "Alpine Rose" *Rhododendron ferrugineum* and its variety *album*.

Here also will be seen the yellow flowers of *Spartium junceum*, a fast growing shrub for dry soils, thriving in full sun.

Howard's Field contains an interesting collection of Cistus and during the earlier part of the month many of the large collection of Lilacs will still be in flower, and the Herbaceous Borders leading into Seven Acres will be commencing a display which will last until September.

The Greenhouses, particularly the Temperate House, will have new and interesting subjects in flower, including numerous Fuchsias both hybrids and species, *Asystasia bella* with lilac-coloured trumpet shaped flowers, *Cestrum aurantiacum*, a good subject for clothing a pillar in a cool house with masses of small golden-yellow tubular flowers, and the magnificent *Solanum Wendlandii* from Costa Rica, an aristocrat of the family.

LT.-COL. FRANK ROGERS DURHAM, C.B.E., M.C.,

SECRETARY, ROYAL HORTICULTURAL SOCIETY, 1926–1945

SOON after the death of Mr. W. R. DYKES, following an accident at the end of 1925, the Council of the R.H.S. appointed Lt.-Col. F. R. DURHAM, C.B.E., M.C., to act as Secretary until the next Annual General Meeting of the Society, when, on February 8, 1927, he was duly elected. He held the post until he retired in March, 1945, at the age of 73. Only a year later, after a brief illness, he died at Woolbrook, near Sidmouth, where, in that pleasant part of England, he had settled to make a garden after a life of varied experience gained in many parts of the world.

Unlike his two predecessors in the Secretary's chair he came to it little known as a horticulturist, but at a time when administrative experience was of much importance, for the Society had recovered to a great extent from the effects of the Great War, which had reduced its Fellowship to about 13,000 in 1918, and had in the meantime grown to a size greater than ever before in its history. With the growth, further activities were inevitable, and the Society's work had to extend in many directions to keep pace with the rapidly growing interest in horticulture throughout the country. To provide room for the increasing numbers of Fellows visiting its Exhibitions and attending its meetings and to afford accommodation for its many and active Committees, a new Hall had already been begun, though only recently, the great Chelsea Show had been re-established and was becoming more extensive and varied than ever, the Lindley Library had outgrown its space, the offices could not accommodate the necessarily increased staff. To cope with the state of affairs thus briefly indicated, the great desiderata in a Secretary was administrative experience, organizing ability and a temperament that would enable him to work with all the varied interests represented in the complex constitution of the continually growing Fellowship and the Council and Officers and staffs of the various departments. Lt.-Col. DURHAM applied himself to all this with unabated zeal throughout the term of his Secretaryship and saw the Society's Fellowship rise to 36,577 in the year before the war, and begin again to recover the setback it received by the 1939–45 war, as soon as there seemed a prospect of peace and some return to a greater prosecution of that art that has always, in our country, received an impetus with the coming of calm after storm in our national life.

FRANK ROGERS DURHAM, born July 10, 1872, was the youngest son of ARTHUR EDWARD DURHAM, F.R.C.S., of Guy's Hospital, London. He was educated at Rugby School and later at University College, London, where he studied Engineering. In 1891 he joined the firm of Sir WILLIAM H. LINDLEY as assistant engineer in water supply and sewerage work in various countries of Europe, especially Germany, Austria, Roumania and Poland, and he later acted as resident engineer for these works at Würzburg, Trier, Eberfeld and Baku.

In 1905 he returned to England and set up as a Consulting Engineer until in 1907 he became Secretary to Sir WILLIAM LINDLEY, then engaged in making a report on foreign waterways for the Royal Commission on Canals and Waterways. This occupied him until 1909. In 1910 he retired owing to ill health, going to live at Salcombe in S. Devon, there to indulge his taste for gardening in a mild and genial climate.

In 1914 he enlisted as a private in the Old Sportsman's Corps, being commissioned in 1915 as Lieutenant in the R.E. and acting as Divisional Officer in charge of water supply at Catterick Camp, afterwards becoming, with the rank of Captain, R.E., Water Engineer to the 4th Army and serving thenceforth until the Armistice in France. His work was recognized by the M.C. and the Legion d'Honneur (3rd Class). He reached the rank of Lieut.-Colonel and on demobilization in 1919 was appointed Director of Works to the Imperial War Graves Commission under Sir FABIAN WARE, his duties taking him into many lands where British troops had fallen in the Great War, until he relinquished the post in 1922 when he was awarded the C.B.E. (Military Section) in recognition of his services.

When he became Secretary the first major operation needing completion outside the normal work of the office, was the building of the New Hall. The foundation stone was laid by Lord LAMBOURNE in October, 1926, and the Hall was opened by H.R.H. Princess MARY on June 26, 1928. In addition to this, very considerable alterations were needed in the Old Hall to allow more room for the Lindley Library and to fit more rooms for the accommodation of the clerical and administrative staff. At the same time steps had been taken to obtain a new Charter (which was granted on July 9, 1928) and to revise the By-laws (see JOURNAL, **54**, p. 115). The enlarged premises gave better accommodation for the Exhibitions which reached new levels of excellence, and it also made possible the revival of Conferences on horticultural subjects. The first of these arranged during his Secretaryship was the successful International Horticultural Congress which met in 1930, one of a series held triennially in various Capital cities, the previous one having met in Vienna in 1927. The organization of this called for a great amount of detailed work and it was successfully carried out and enabled the Society to strengthen the cordial relations it had maintained for a long period with horticulturists abroad. One of the sections of this Conference had for its aim the standardization of colour nomenclature as applied to plants. DURHAM took a special interest in this resulting eventually in the collaboration of the Royal Horticultural Society and the British Colour Council in the production of the Horticultural Colour Chart, the first volume of which was published in December, 1938, the second in February, 1942. Various special Conferences followed: the Primula Conference in 1928, the Conference on Garden Design in 1928, on Conifers in 1931, on Lilies in 1932, on Apples and Pears in 1934, on Soft Fruits in 1935, on Daffodils in 1935, on Rock Gardens in 1936, and on Ornamental Trees and Shrubs in 1938, all of them calling for careful preparation both for the Conferences themselves and for the special exhibitions which formed a feature of them. Other Conferences were in view and partly prepared for when the War came and special activities were directed towards increasing the Nation's food supply by encouraging the growing of vegetables in allotments and private gardens everywhere, by schemes for the education of members of the Land Army, and of the Forces in preparation for their civil life and so on, particulars of which will be found in the Annual Reports. With all this special work, the normal work of the Society at Vincent Square and at Wisley continued to increase and to entail more and more responsibility upon the Secretary's office. Perhaps one of the most important directions in which changes were effected was the setting up of joint-committees of the Royal Horticultural Society and the Specialist Societies for the making of Awards to the plants with which the latter are concerned. This had already been begun, but negotiations—sometimes quite prolonged—resulted in the extension of these relations to nearly all the Specialist Societies to the mutual benefit of all and to an increased confidence in the Awards to Plants. An extension of the principle of special Committees for particular plants begun about 1839 led during DURHAM's Secretaryship to the setting up of special discussion groups, first, the Lily Group and, more recently, the Iris Group and the Fruit Group. The publication of a special Year Book on Daffodils, already begun, was followed by a similar Year Book on Lilies, and that quite recently by one on Rhododendrons. The work entailed by the examinations annually held by the Society continued to grow and needed constant adaptation to the needs of gardeners of all grades from the youth to the professional gardener ready to take his place in the management of gardens or nurseries, and to those who teach as well. Nor must the various publications of the Society be forgotten, for DURHAM made the *Gardener's Diary* as well as the Horticultural Colour Chart his special care, and during his Secretaryship the series of *Garden Monographs* was begun, the *Index Londinensis* was completed and negotiations for the revision of NICHOLSON's *Dictionary of Gardening* put through.

His genial personality, courage in facing difficulties, and unremitting zeal helped to overcome difficulties and to carry through the negotiations and arrangements which all this entailed, with success and to the benefit of the Society and its purpose. Towards the end of his Secretaryship his health had caused some anxiety but it was hoped that rest would restore him and he retired with the good wishes and hopes to this end of all who knew him and his work at Vincent Square. His busy life, however, soon reached its end and he did not live long enough to see the results of his new work in his garden at Woolbrook, leaving a widow and daughter to mourn his loss.

F. J. C.

F. R. D.—AN APPRECIATION

APART from a review of Colonel DURHAM's distinguished career and great services to his country and to the R.H.S., there is room for a short note dealing with his singularly attractive personality. So many fine qualities contributed to the formation of his character, that it may be likened to a perfectly cut diamond in which the many facets combine to produce the brilliancy of the gem.

It was the combination of a highly cultured mind, the charm of his manner and personality, his kindness of heart and readiness to help which endeared DURHAM to his colleagues, his staff and his friends.

An outstanding characteristic was serenity, not the passive kind found among the aged which is akin to patient resignation, but a power of perfect control that kept him always calm, courteous and unruffled. Other polished facets of the diamond were represented by stability and the gentleness that springs from strength and integrity of purpose which accounted for the unfailing good humour and helpful wisdom with which he so often strengthened and assisted others.

It was always the same genial friend who welcomed us in the Secretary's Room at Vincent Square to solve our problems and put fresh interest into whatever work was in hand. Besides these very solid virtues we must not forget his fine sense of humour and sparkling wit that made him such a pleasant companion. He was the very man we would like to sit next to at a dinner, or to chat with at any time about books, current affairs or any subject. He was a sympathetic listener and never failed to produce original views and illuminating information from his store of knowledge.

Thus was built up a character and personality as precious as a diamond "of the first water." The passing out of our lives of such a friend leaves a great blank, but it is well to preserve grateful memories of such a man and of his good work.

TRESCO UNDER THREE REIGNS

By Rt. Rev. J. W. Hunkin, D.D., Bishop of Truro

PART II.

TRESCO UNDER MAJOR ARTHUR DORRIEN-SMITH.

IT will be clear from the previous article that when Major A. A. DORRIEN-SMITH succeeded to Tresco in 1918 he was already a gardener of experience and distinction. He continued to keep in close touch with Kew, the *Botanical Magazine*, the Royal Horticultural Society and many of the great gardeners on the mainland. Close at hand at Ludgvan Rectory was his friend (and relative by marriage) Canon ARTHUR TOWNSHEND BOSCAWEN, and the two were able to work a good deal together.

In June, 1918, *Metrosideros collina* flowered for the first time at Tresco. It had been introduced from Wellington by the Major himself. A coloured drawing of it appeared in the *Botanical Magazine* (Vol. 146 (1920) t. 8846). It may be convenient to collect at this point the other subjects which I have noted in the *Botanical Magazine* supplied by Tresco. They are the following:

Vol. 149 (1923)
  Table 8998, *Callistachys ovata.* Major DORRIEN-SMITH raised this plant from seed sent from Sydney in 1911. It has a silvery foliage and compact racemes of bright yellow flowers. At Scilly it flowers almost throughout the year, but most perfectly in July.
Vol. 150 (1924)
  Table 9032, *Kunzea ambigua,* an Australian plant with myrtle-like flowers.
Vol. 160 (1937)
  Table 9493, *Melaleuca linariifolia.*

The *Kew Bulletin*, No. 5 (1920) contains a short account of the "Tresco Abbey Garden" (XXIV, pp. 170–174), by A. W. HILL, the late Director of Kew. This is the best account which has so far been published. Sir ARTHUR (as he later became) divided the area into three sections:

1. *The Garden proper.* The soil is light, a mixture of sand and peat, with outcrops of granite rock. It is wonderfully sheltered, and in the summer it becomes hot and dry. Here Mesembryanthemums, and Pelargoniums of many colours, sizes and varieties flourish as in their native homes.

2. *The higher ground* planted with *Cupressus macrocarpa* and *Pinus insignis* among Gorse and Heather. Here Sir ARTHUR mentions Melaleuca, Hakea, *Leucadendron argenteum, Araucaria excelsa* and a number of species of Acacia.

3. *The Northern Slope* of the central hill where the Rhododendrons were planted such as *R. arboreum*, *R. Aucklandii* and, very striking, *R. Veitchianum* with its magnificent sweetly-scented white flowers in mid-April.

Sir ARTHUR concluded his account by describing the Tresco Garden as "an imperial asset of great importance to the botanists of this country whose work lies with the botanical resources of the British Empire."

Some nine years later, in December, 1929, the garden was devastated by a terrific tempest. Major and Mrs. DORRIEN-SMITH were on the mainland at the time and they received telegram after telegram recording the number of trees blown down. On the Wednesday the gale was 93 miles an hour from the south-east, on the Friday above 110 miles an hour from the south-west, and on the Sunday 91 miles an hour from the north-west. The velocity of the wind did not fall below 70 miles an hour for more than eight hours during five days. Altogether about 600 trees on the island were blown down. When Major and Mrs. DORRIEN-SMITH finally reached home in a torrent of rain they could hardly find their way. Paths were blocked and obliterated; trees uprooted had come crashing down on bushes and beds, and the ground was thickly strewn with branches and debris. Even the Ilex lost their leaves. The Major said to Mrs. DORRIEN-SMITH, "Well, this is the end of the garden in my time. I hope the children will see it again." Happily the recovery was far more rapid than he could have dared to hope.

About six years later the *Gardeners' Chronicle* (August 10, 1935, pp. 102, 103) contains an interesting description of a visit to the garden in June by Mr. E. BROWN, a brother-in-law of the present Head Gardener, Mr. W. G. ANDREWS. The garden was again bright and lovely as of old.

In 1935 a beginning was made in compiling an official list of plants cultivated in the garden. A preliminary list was drawn up which still exists, though it has never been thoroughly revised. I have studied the list and a very rough estimate gave the number of species and distinct varieties recorded as about 3,500. Some of the most interesting items are the following:

Acacia—39 species.
Agave—69 species, mostly from Mexico. There are not so many in the garden now.
Aloe—60 species.
Aralia—9 species.
Areca—*Baueri* and *sapida* (which flowers and seeds freely).
Arundinaria—various species including the giant *Hookeriana*.
Baeckea—several species (Heath-like shrubs with the daintiest tiny flower.
Banksia—14 species, including *grandis*, *integrifolia*, *littoralis* and *serrata*.
Callistemon—10 species.

Cistus—at least 15 species.
Coprosma—12 species including *Baueri* with its handsome thick, shining leaves.
Cotyledon—19 species.
Crassula—17 species, *coccinea* very abundant.
Cytisus—21 species.
Echeveria—10 species (not so numerous now).
Echium—7 species.
Eucalyptus—29 species.
Fuchsia—28 species, including *cordifolia, fulgens, splendens, triphylla* and garden varieties.
Hakea—28 species, e.g. *suaveolens*, with racemes of fragrant white flowers.
Haworthia—11 species.
Hedychium—8 species, including *coronarium* and *Gardnerianum.*
Leptospermum—11 species, including the Australian Tea-Tree (*L. laevigatum*).
Melaleuca—22 species.
Mesembryanthemum—153 species.
Metrosideros—*diffusa, lucida, robusta, tomentosa.*
Olearia—33 species.
Pelargonium—159 species and distinct varieties, in charming groups all over the garden. Many have scented leaves.
Pittosporum—at least 18 species.
Rhododendron—135 species, including *Dalhousiae, Veitchianum,* etc.
Salvia—18 species.
Sedum—28 species.
Senecio—34 species, including *grandifolius, Kirkii,* etc.
Statice—17 species.
Veronica—62 species.

With such a galaxy of plants it is not surprising that no month in the year is without considerable flower, the predominant colours varying from season to season. In March and April, for instance, the garden is yellow with Genista, Coronilla and so on. In July it is red, with the great *Metrosideros tomentosa* blazing far out to sea. And besides the continuous interest of the circling year the garden from time to time witnesses some outstanding display. For example in 1944 no fewer than fifty-seven great *Furcraea longaeva* were in flower together, the tallest being one 40 feet in height.* These fountains of beautiful wide open cream flowers were a very remarkable sight, and the flowers were succeeded by large green pods of seed and hundreds of bulbils dangling from the branches. These dropping to the ground very easily take root.

During the recent war a number of incendiaries were dropped on the island of Tresco. The garden had a narrow escape. A *Pinus radiata* just above the garden proper was set on fire, but happily the fire was extinguished before any serious damage was done.

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* See R.H.S. JOURNAL, Dec. 1944, pp. 355, 356.

It is indeed a great matter for rejoicing that Tresco garden has so well survived the long years of endurance and still smiles its generous welcome to the visitor. It will, I think, be fitting to end this account with a brief conducted tour of the garden.

TRESCO AT THE END OF AUGUST

It is about a mile from the end of the little pier at Old Grimsby to the gateway which marks the entrance to the Abbey Garden. Our way lies along the shore which we keep on our right, with a short stretch of very blue sea and very white sand separating us from the two shapely hills of the island of Bryher on the west. As we strike south-east and leave the shore we find on our left a fresh-water lake. The road itself begins to be flanked by masses of *Phormium tenax*, the New Zealand flax, which has naturalized itself in this part of the island. The road soon becomes a well-marked carriage drive (there is still no motor-car on Tresco), with Hydrangeas on the left and Olearias on the right, the most noticeable of which is the late-flowering *O. furfuracaea*. On the left a big Eucalyptus leans over the road and a little beyond it is *Brachyglottis repanda*, very common in Tresco, and, in spite of its large, rather tender-looking leaves (white underneath), very wind-resistant. Near it, a little further along on the same side of the road, is a huge clump of *Sparmannia africana*, with leaves like those of *Abutilon vitifolium*, and beautiful white flowers with sensitive golden stamens in winter.

On both sides of us now there is a wood. On the right it rises sharply and forms the northern slope of the Abbey Hill. Here among the pines are tall specimens of *Clethra arborea* with branches of scented lily-of-the-valley-like flowers in August. Here also are a number of Eucalyptus, *globulus*, *pulverulenta* and *cordifolia*; several species of Acacia (e.g. *longifolia*, *floctonae*, *Baileyana*); and some Rhododendrons, including a good *Falconeri*, with the lovely brown felt under its great leaves. And where the wood is thickest there are a few Nothofagus and some uncommon Conifers.

On the lower and narrower strip of woodland on the north of the road are more fine *Clethra arborea* and a number of Rhododendrons of the tenderer sort. On this side of the road another big Eucalyptus has been blown into one of the great *Cupressus macrocarpa* which more or less line this part of the road. The signs of ancient and drastic clipping on these *macrocarpa* are a reminder of the gigantic *macrocarpa* hedge which was an amazing wall of bright feathery green forty years ago.

We are proceeding south-east towards the Abbey itself. I might have mentioned before the long-leaved Cordyline, a natural hybrid which has appeared in Scilly; there are several specimens along the Abbey Walk and a number elsewhere in the garden.

As we approach the archway into the courtyard of the Abbey we bear left and descend towards a straight road which stretches over the open sandy plain in the direction of Penzance (" the Penzance Road "). The little path on our left leading north would take us into low-lying woodland on the shore of the lake. Here are splendid clumps of *Olearia chathamica* and *Olearia semi-dentata*, the two Daisy bushes which surpass all others in the beauty of their great purple and violet Daisy flowers. Immediately opposite to this turning is the entrance to the garden proper, and Mr. AUGUSTUS SMITH himself welcomes us in with the words he had inscribed on a slate just inside the gate :

> " All islanders are welcome to walk in these gardens
> but are requested
> to keep the main walks
> not to go up to the house nearer than the under terrace in front
> and to abstain from picking flowers and fruit, scribbling
> nonsense and committing suchlike small nuisances.
> Enter then, if it so please you, and welcome."

This notice is on our right as we enter : on our left is a well-grown *Banksia serrata*, at the end of August still lit up with its large torches of yellowish grey flowers, and a little further along *Olearia Colensoi* with its great leathery leaves, green above and white and woolly beneath. On our right a steep rocky slope leads up to the East side of the Abbey house itself. This is gay with Agapanthus (mostly blue, but some white), Echiums, Arctotis, Gazania, *Clematis flammula*, Crassulas, and Pelargoniums of various shades of red and pink. Here also as small trees are *Hakea suaveolens* and *Metrosideros robusta*. The former flowers white in October, and the latter a blazing red in June. There are a number of other bushes and smaller plants including Veronica (one a fine dark purple), Escallonia, Corsican lavender and the big dark flower spike of *Doryanthes Palmeri*, the Australian Spear-Lily.

Our path takes us round and below the south of the house, and on our left are three large *Phoenix canariensis*. More (and larger) of these we shall see in the middle of the garden. Passing through a little gate and leaving a Dicksonia and a Melaleuca draped with lichen on our right, and a bank of Fuchsias of a dozen kinds on our left, we have the house towering above us, with a steeper and rockier slope than before falling down to four small ponds at our feet containing gold-fish and Water-Lilies. The path has become a road leading round this slope and upwards to the door of the house. On the right-hand-side of this road are four *Acacia dealbata* and a clump of late-flowering *Watsonia Galpinii* of a particularly beautiful red. The slope is bright with plants similar to those on the eastern slope, but with the addition of Agaves (with their flower spikes), Nolinas, Furcraeas, Acanthus, Hedychium, and, down by the ponds, Rodgersia ; and higher up on the left of the road a massive old Dasylirion (*D. acrotriche*), with clumps of Aloe (*A. arborescens*) on the rocks above which greet the New Year with spikes of red flower. Instead of bearing right along the road leading to the house, we turn sharp left and go southwards to the gate leading out from the garden to the Abbey Green. On our left is a tall

Datura with orange tubes swaying in the wind. Before we come to this gate we find another on our right leading into the south-east part of the garden. Going through this gate we come to an open space, and looking north we see in front of us the main arch of the ruins of one of the buildings of the ancient Abbey (not the Church, which has entirely disappeared). Moving towards it through two lines of high bamboos we enter a round enclosure known as "the Hop Circle," though the trellis of hops which gave it its name has disappeared. In this enclosure, which is bright with Fuchsias, there are over a dozen *Chamaerops excelsa*, with two very large Cordylines, one on either side of the path. Passing right through the Hop Circle we cross the Eastern end of the Long Walk (see later) and go straight on to the arch in front of us. The space immediately in front of it contains masses of blue Agapanthus with more Fuchsias and purple and white Veronicas, and on the east side a great round cushion of *Bupleurum fruticosum* with leathery leaves and compound umbels of yellow flowers.

We leave the ruin at its south-west corner and enter a little enclosure with a low wall on the north side of it. By this wall are two good Citrons on which green and yellow fruits are hanging. On our left is propped up a long sprawling Dasylirion (*D. acrotrichum*) with two smaller ones riding on its back. A little further on is a large (double) Camellia.

Turning back we ascend four steps leading north into a wider path. Half left is a magnificent Canary Island Palm (*Phoenix canariensis*). Several of them were planted in this part of the garden in 1908. In their early days they were given fish manure, which was used a good deal in the garden. Seal fat was also found useful as a protection against rabbits. These Palms and also *Cocos campestris* are now very impressive with their giant fronds rising aloft from one single main trunk which bristles with the remains of former fronds. In the crevices thus formed various seedlings appear, notably Veronica, Pittosporum, and, strangest of all, *Metrosideros tomentosa*. Through the kindness of Major DORRIEN-SMITH I was given two of these Metrosideros seedlings, and the Head Gardener, Mr. W. G. ANDREWS, took them out for me from the trunk of a Cocos with great care. Their long roots were wrapped round and embedded in the surface of the trunk in an astonishing manner.

Near by are two fine *Metrosideros robusta*, with neat heads of small bright green leaves with a pleasant brownish tinge in the mass. Bearing right, between blue and white Veronicas and red Fuchsias, we find ourselves almost back where we were on the road south-west of the Abbey House. Turning to the left we enter the Middle Terrace at its eastern end.

On our right there is a big Leptospermum, one of the many in the garden, and on the wall at the back of a little alcove the creeping Metrosideros, *M. diffusa*. A little further along higher up on the rocky slope is a clump of Rhodostachys. There are masses of two Rhodostachys in the garden: *R. pitcairniaefolia*, with long narrow leaves turning bright red at the base and enfolding a rosette of blue flower, and *R. andina*, with a pink flower and no colour in the leaf. A group of either in full bloom looks like an assemblage of bright, still, octopus. A little further on the same side and close to the path are two *Chamaerops humilis*, exactly like their taller relatives but low and spreading. Higher up and a little beyond is a flourishing *Acacia longifolia* (of which there are many in the grounds of the Abbey), and near it to the west is a large Agave. Agaves, it may be remembered, closely resemble Aloes, but they are armed more fiercely with spikes.

Behind the fine Escallonia hedge on the opposite side of the path is one of the gayest plots of the whole garden. It is bedded out with purple heliotrope and red and white Pelargoniums, and hence it is known as " The Flower Garden." There are two stately *Cocos campestris* south of the Escallonia hedge with bright yellow Gazanias, the small yellow buttons of *Chrysocoma coma-aurea* (almost a weed in the garden) and the blue Daisies of *Aster Pappei.* South of these are eight large Cordylines, and on the western and southern borders Callistemon, an Australian *Solanum* (*aviculare*) with its attractive yellow fruit, a light purple flowering tree Fuchsia looking not like a Fuchsia at all (*F. arborea*), a fine Myrtle, an Araujia with delicate pinkish flowers with darker centres like miniature jam tarts, and a great Iochroma with showy purple-blue tubular flowers, one of the few evil-smelling plants in the garden.

On the west the Flower Garden is bounded by the high wall built by Mr. AUGUSTUS SMITH to give shelter to his garden in its early stages. On the wall are *Cantua dependens*, *Lonicera etrusca* and *Mandevilla suaveolens.* Looking over the wall from its western side is the biggest *Metrosideros tomentosa* in the garden. It is a magnificent tree and its masses of aerial roots hanging down towards the ground are an extraordinary sight. Near it are a number of interesting shrubs, and small trees. A large *Cotoneaster Harroviana* flourishes on the wall; opposite it there is a hedge of *Eugenia Ugni* with *Mitraria coccinea* growing into it. Behind these is a good specimen of *Anopterus glandulosa* and a tall *Eucryphia cordifolia*, freely bearing its small saucers of white flower. Near these again is *Hoheria populnea* also in white flower, and, closer still to the Metrosideros, a Sassafras with shining green leaves strongly aromatic when crushed. On the lower ground to the South the African *Lapeyrousia cruenta*, spreading itself under the trees, begins to display its slender tubes of red flower in September, and on the west of Mr. AUGUSTUS SMITH's wall are good plants of *Clianthus puniceus*, the New Zealand Lobster Claw, and the lemon-scented *Lippia citriodora.*

Returning to the Middle Terrace and leaving a big and shapely bush of *Eupatorium macranthum* behind us, we find the path widening and going round a kind of apse of rocky wall at the foot of which there is a galaxy of red Crassulas, Mesembryanthemums of various colours and scented-leafed Pelargoniums, among them that bright scarlet, 'Moore's Victory'; while, as if glued to the wall, Aeoniums, in great number, spread their green succulent rosettes. In a large round bed on our left are Eucomis, bristling with small starry blossoms, Cacti, Opuntias, Echiums, Watsonias, Dyckias (strangely enough beloved by rabbits), and varieties of smaller plants

Immediately beyond the apse the Middle Terrace is crossed by a path traversing the garden from north to south, a distance of about 160 yards, known as the Lighthouse Walk, because it leads down to the old brazier, formerly used in the Lighthouse on the island of St. Agnes, and now perched on the south wall of the garden.

Top Terrace

Turning right we ascend steps between lines of Dasilyrions leading to the Top Terrace. Immediately in front of us there is a stone figure of Father Neptune on a little rockery. Directly below him are Pelargoniums and specially the beautiful purple-crimson 'Rollison's Unique,' a mass of *Aster Pappei* with its charming blue daisy-heads and a large sofa of the Irish Heath, *Menziesia*; while at his back the rising ground is carpeted with bright Mesembryanthemums and Crassulas.

From the Top Terrace we have a fine view of the whole garden below, and further south over the sea to the islands of St. Mary's and St. Agnes. Looking along the Terrace to the East we have on our right a well-grown *Dryandra formosa* from West Australia, and behind it a *Coleonema* (starred with tiny white flowers in January), a *Barosma* (with its rather unpleasant odour, but delightful in January with the little white flowers among its bright green leaves), a great clump of *Agonis marginata* (with grey leaves and charming clusters of small white flowers with dark centres in winter), and a fine *Banksia integrifolia*. Turning westward along the Terrace we have a bush of grey-leaved *Eriocephalus africanus* on our left, and a little farther along on our right a fine clump of that decorative Heath *Erica glandulosa*, with its large salmon-pink tubular flowers. A little beyond it on the other side there is *Coleonema album* with tiny fragrant leaves of bright green which will be decked out with white flowers from the New Year to March. Not far on the other side of the path again are a small pink Correa (*Correa pulchella*) and some pink Belladonna Lilies. Of these the garden has four kinds: the ordinary (*Amaryllis Belladonna*), var. *rubra*, a hybrid produced by crossing *rubra* with the common Belladonna Lily, and *Kewense*, with a yellow throat and more erect in growth.

Here on the left the planting opens out and there are masses of smaller plants: a blue *Centaurea* from Palestine, a *Solanum* from Abyssinia with leaves prickly and grey, a fine dark Gazania, with a collection of shining Mesembryanthemums—*Peersii* (a rich, dark red), the tiny purple *hispidum*; *splendens*, and *speciosum*, both a rich orange and both with wiry stems, another of bright purple (*Mahoni*), and a lovely big pink *Peersii* (best in its second year). Here also are *Coleonema roseum* and Cistus of more than one sort. There are a great many large Cistus along the Terrace and in other parts of the garden, and they contribute with Eucalyptus, the scented-leaved Pelargoniums and a number of other aromatic plants to give a delicious spicy fragrance to the garden, especially on a sunny still day, when the whole place is humming with bees.

A few paces further on the left is a little tree of *Myoporum laetum*, the bright green leaves of which are covered with translucent spots. There are a number of these Myoporum in the garden, and they look neat and well groomed. Just beyond, on the same side of the path is *Acacia cultriformis*, and the Poison Arrow Plant of the Bushmen *Acokanthera venenata* (*Toxicophlaea spectabilis*). *Salvia Grahamii* is in flower a little beyond it, and on the opposite side of the path is an Echium with its tall flower spike, though the tiny flowers attached to it have disappeared. Further on is a big *Olearia Forsteri*, with its crinkly leaves, green above and white beneath, and next to it *Coprosma Cunninghamii*, while almost opposite on the other side of the path there is a collection of Proteas (small plants of five or six kinds recently planted out). Here also are *Hakea gibbosa*, *Leucospermum Bolusii*, and a number of *Beschorneria yuccoides*. Three of their stiff, long, snake-like flower stems have reddish-green seed pods dangling from them. Near them are a couple of *Callistemon salignus* and *Acacia juniperina*. It was just a little further on that *Hesperoyucca Whipplei* not long ago shot up its lovely scape of fragrant, nodding, creamy-white flowers.

On the other side of the path young seedling Tree Heaths have sprung up of their own accord. The parent plants are trees indeed, on the north of the path, and above them is a *Melaleuca armillaris* with a mass of tiny leaves of a fresh bright green, *Baeckea virgata*, with its slight branches covered with tiny, fascinating white stars of flower, and a planting of *Acacia acinacea*.

We now reach the gate opening on to the grassy path which leads two hundred yards to the Monument on the top of the hill, from which there is a magnificent view over the sea and the islands and rocks to the west and south. Roughly in the same direction as the path, on the south side of it, is a splendid row of *Metrosideros tomentosa*. In July they are smothered in flower, the blazing red of which can be seen far out at sea.

Along the south side of the path itself are five flourishing *Araucaria excelsa*, two of which shot up growth of 3 feet during the damp summer of 1946. Near them are a couple of fine young Red Gums (*Eucalyptus ficifolia*) just coming into magnificent flower (in September), *Psoralea pinnata*, a large *Acacia verticillata*, and *Acacia melanoxylon*; while on the north side of the path there are the tall dead masts of two *Furcraeas* left over from the flowering of 1944. On the north of the Monument itself is a bright purple carpet of Heather, and near it is a fine healthy specimen of *Metrosideros lucida*, the best Metrosideros to try on the mainland, though it does not do as well as the others here in Scilly. On the other side of the Monument a number of young trees of *Pinus canariensis* are doing well. Retracing our steps through the gate and bearing right along a hedge of *Correa virens*, we descend gently to the Middle Terrace again, now at its western end. (Fig. 94.)

MIDDLE TERRACE

Just in front of us is a row of three young Furcraeas, like out-size Yuccas, and the corner on our right is a bank gay with Crassulas and Mesembryanthemums (including *speciosa*, *splendens*, *Brownii*, *coccinea* and *Framesii*, a small bright purple). Along the walk on our left are Pelargoniums from the Table Mountain, pink with purple splashes, and a little further along the charming pink *Pretty Polly* and *Monsieur Norin*, a delicate red with a little white at the centre, one of the most elegant of all. As we descend the gradual slope we find a fine *Myrtus bullata* on our right, and on our left the only *Helichrysum petiolatum* allowed in the garden proper. Its luxuriant growth of grey leaf and yellow flower-head give some indication of its strength and vigour. In the woodland above the garden it overwhelms and stifles the very Gorse. A little farther on and higher up we see a group of Puyas from which five huge flower spikes (the flowers themselves being over) mount stately guard. Below them on the wall itself is a cluster of bright yellow Daisies, *Astericus maritimus*, and a clump of *Euryops virgineus* with rods of tiny leaf seldom devoid of bright yellow buttons of flower.

A few paces along, a turn to the right leads to the lower part of the garden. On the corner here are masses of Echiums. By this time it is obvious that Echiums form one of the striking and distinctive features of the garden; and in Major DORRIEN-SMITH'S study there are three magnificent paintings of *E. Auberianum* (pink), *E. Pininana* (blue) and *E. Wildpretii* (salmon). Now, at the end of August, Echiums are not, of course, in flower.

As we stand at the turning just mentioned and look across it half-right we see a fine *Agave Franzosinii* with a bluish tinge on its great, thick, spiked leaves. Passing on, we find ourselves in one of the most charming open spaces of the garden. On the left there is a wide level rectangle formerly occupied by greenhouses. It is now bright with yellow Gazanias, elegant Arctotis, pink and white Pelargoniums, tall and slender Watsonias from South Africa of delicate shades of vermillion and pink, with Echiums, Kniphofias, and brilliant Tigridias. In the north-west corner is a resplendent bird-like *Strelitzia Reginae*. There are two other Strelitzias in the garden: the smaller *parvifolia*, and the massive *Augusta* which might easily be mistaken for a Banana (Musa).

Here in the Middle Terrace are also good plants of *Greyia Sutherlandii* from Natal, with racemes of bright scarlet when in flower, some lovely dark red Abutilons, *Malvastrum puniceum*, covered with small light purple flowers, Ipomaea, Hedychium and Canna. A little farther to the east on the same side of the path on the other side of the recess shown on the map, at the back of a similar foreground of Watsonias and Sparaxis, is a low wall on which are two delightful Jasmines (*floribundum* and *angulare*) with large, fragrant flowers; and on the bank above, a number of big impressive Agaves. Noticeable here, too, are upstanding specimens of *Cupressus Lawsoniana* var. *Wisselii*. On the other side of the path, the south side, we look over a hedge of red Pelargoniums to a big *Rosa Moyesii*, and a great bush of the Australian *Bursaria spinosa*, smothered in delicate white blossom in August and September. Near it is the rich dark purple Veronica, *Veronica Dorrien-Smith* and a little farther on a tall *Veronica Lewisii* which will be gay with white-and-purple flowers in January. On either side of a small pond just here is a clump of the low-growing *Cordyline erythrorachis*, and between this and the Middle Terrace itself is a line of *Antholyza* with its curved red flowers and Montbretia-like habit. There are two Antholyzas in the garden: this, *paniculata*, flowering in August, and *praealta*, flowering in Spring.

We are now again approaching the Lighthouse Walk.

THE LIGHTHOUSE WALK

As we descend towards the south we have a tall hedge of Escallonia on the left, and a lower hedge of *Myrtus ugni* on our right, now laden with tiny fruit turning dark crimson (which makes a delicious conserve). Lower down, the hedge on either side is the hedge of clipped sycamore of the original shelter planting of Mr. AUGUSTUS SMITH.

But before we come to that an opening on our right leads into a little enclosure known as the Pear Garden, from a large old Pear tree which stands in the middle of it. Here are a number of interesting plants. On the wall on our way in is a charming grey-leaved Convolvulus (*C. mauritanicus*) with flowers of a beautiful blue. Opposite it are *Swainsonia*, *Ballota* and a good *Teucrium*. Among the other plants to be found in the Pear Garden are the charming *Polygala myrtifolia* from South Africa, a *Rhaphithamnus cyanocarpus* from Chile thickly draped with lichen, two white Genista (*G. monosperma*), *Drimys colorata*, *Pittosporum Ralphii*, the Senecio with the huge leaf (*S. grandifolius*), *Melicope ternata*, the pine-apple scented Salvia (*rutilans*), the curious *Restio subverticillatus*, the Kaffir Lily (*Schizostylis coccinea*), and other Lilies (e.g. *Lilium speciosum*). The Abbey Garden contains many groups of such lovely Lilies of various kinds, Tiger Lilies, *Lilium auratum* and so on.

Returning to the Lighthouse Walk and continuing to descend we soon find ourselves in the Long Walk which runs straight across the garden, 250 yards from east to west.

THE LONG WALK

Entering the Long Walk we turn eastwards. On the left is a variegated Coprosma of an almost dazzling brightness, and a little farther along on the other side there is a big *Notelaea excelsa* from the Canary Islands. It has been adversely affected by former drought. We pass into a deeper shade under a great *Myrica Faya* from the Azores about a hundred years old on the right, with a tall *Vitex littoralis* on our left, sprinkled with bell-shaped flowers of a light claret colour in winter. Just east of the Myrica is a small tree of delicate branches which it is difficult to recognize as a Hypericum, but a Hypericum it is, from Kenya; and next it is a fine Pittosporum (a hundred years old) too tender for the mainland, *P. undulatum*, with seed fragrant with a scent like eau-de-Cologne. Opposite, on the left, is *Griselinia lucida*, with its curious intertwining growth and its amazing thick shiny leaves. A similar Griselinia with smaller leaves (*G. intermedia*) is on the other side of the Walk and next to it a tall *Halleria lucida* whose small flowers are orange-red in the winter. Its young twigs rise in strange perpendicular way from the main branches. Leaning into it from the other side of the Walk is a mighty *Banksia littoralis*. Between this and the *Griselinia lucida* is a small *Areca Baueri* which has lost its head. East of the Banksia is a soaring Camphor Laurel with the bright leaves of a large Coprosma below almost shutting it out of sight. Another Areca with its huge fronds is on our right. The plot of ground just south of the Long Walk here is full of interesting plants and is known as " The Nursery Garden " (see below).

Immediately in front of us at the eastern end of the Long Walk, is a door which leads into a small walled garden containing an old pump, hence known as the " Pump Garden." Here is a *Bomarea*, one of the climbing Amaryllidaceae, with clusters of orange-red tubular flowers, a *Kunzea peduncularis* against the North wall, a *Michelia fuscata*, *Musschia Wollastoni*, with an inconspicuous green flower and lace-like serration on the side of the leaf, *Brachysema acuminata* (with pea-like flowers), Celmisia, the New Zealand Mountain Daisy, flowering at Easter, and a number of other plants large and small.

We must turn back now and retrace our steps along the Long Walk. Not far from the point where the Walk is crossed by the Lighthouse Walk there is a Chamaerops on the south side which is by far the tallest in the garden, a remarkable object with its 40 feet mast topped by a flattish head of fronds. Behind it and a little further west is a large *Escallonia revoluta*, with small white flowers and a strong pig-like smell. On the other side of the Walk, the north side, are *Veronica macrocarpa*, *Lagunaria Patersonii* and *Isoplexus canariensis*. Next, on the south side is a short avenue leading south called Dracaena Avenue from the Cordylines (*Dracaenas*) which line it, under which are a number of Hydrangeas with large flowers, mostly blue but some pink. On the north side *Ozothamnus rosmarinifolius* is succeeded by *Medicago arborea* and then by *Melianthus major*. Beyond that is a great *Eucalyptus globulus*. Some years ago it almost blew down, but Major DORRIEN-SMITH had it drawn up again by means of a monkey winch, and it is still full of life and vigour. We must not omit *Semele androgyna* climbing on the south of the path, and some distance beyond it *Luculia gratissima* from the Himalayas and a *Metrosideros robusta* betraying its epiphytic habits by growing out of a Cordyline. Opposite to this on the north side is a Guatamala Yucca. (Fig. 95.)

We come now to one of the most impressive sections of the whole garden. On our right is a fine *Ficus macrophylla*, with shining green leaves and the young leaf at the end of each branch folded into a thin red sheath. Beyond it is a pretty bush of the yellow-flowered Australian *Candollea cuneiformis*, and beyond that again is a remarkable Puka, *Meryta Sinclairi*, with immense leaves of lustrous green, the sacred tree of the Maoris, somewhat uncommon even in its native home (the Great and Little Barrier Islands). Next to it on the west is the twisting growth of the dark-leaved *Elaeodendron capense* from the Cape, the white fruit of which strews the ground about Christmas time. On the other side of the path is another fine specimen of *Metrosideros robusta* growing out of a Cordyline which is still vigorous and has surrounded the Metrosideros with tall shoots. Leaning out towards it across the path is a large and ancient *Sophora microphylla*, one of the old originals of the garden, now propped up, but with plenty of long leaves and green hanging pods of seed. A little beyond it is a splendid Karaka (*Corynocarpus laevigata*). Its foliage is rich and heavy and its shining fruit is rather like a crop of immense green dates. In New Zealand they are eaten by the Maoris (when they turn orange); the seed is poisonous.

On the opposite side of the path is a magnificent Nikau Palm, *Areca sapida*. It regularly produces a great bunch of pink rods of flower, protected by a large yellowish waterproof sheet till they are ready to show themselves. Almost hidden behind it is another palm from the Pacific, *Seaforthia elegans*. Just by it on the west are *Fuchsia splendens* and *Luculia pinceana*, and then the largest Norfolk Island Araucaria (*A. excelsa*) in the garden. Its wide-spreading branches, with their stiff branchlets of tiny leaves, bend upwards, and climbing over them are a red Rose and a yellow Banksian Rose. Behind it is a *Fuchsia excorticata*.

On the other side of the path there is a group of interesting plants including in addition to a number already mentioned in connexion with other parts of the garden: *Citharexylum*, and a tall *Hymenosporum flavum* with shining leaves and fragrant flowers, which are at first white and then when the stigma matures become yellow. Close by is another huge *Eucalyptus globulus* up which is sprawling a mat of *Elaeagnus reflexa*, the undersides of whose leaves are a beautiful silvery bronze.

We now come to two small paths meeting the Long Walk at right angles. The one to the north leads into a part of the garden known as " Upper Australia," and the one on the south to " Lower Australia.' We will return to these later.

Just west of Lower Australia is a mass of *Muehlenbeckia complexa* reaching high up a tall Ilex. A little further on the same side we find a *Nothopanax Davisii* with large leaves green all through, and we pass underneath a big *Hakea suaveolens* propped up by a fork of timber, and where the fork meets the trunk the Hakea has sent down aerial roots which have reached, and established themselves in the ground. Near it on the opposite side of the Walk is a beautiful fine-leaved *Melaleuca linariifolia* with delicate white bottle-brushes of flower. A little farther along on the same side is a thick bush of *Calceolaria violacea* with a thicket of little leaves, covered with pale blue flowers in May. Another little path strikes north-west from here and looking up it we see a healthy *Rhaphiolepis ovata* (looking like a Rhododendron), and *Goodia latifolia*, and a large group of more than one kind of Ginger

Lily (*Hedychium*). And then finally, passing *Escallonia organensis* on the right and a variegated Elaeagnus on the left, we reach the Eagle which marks the end of the Long Walk.

The path at right angles to the Long Walk skirting the western wall of the garden used to be called the Aloe Walk, but the Aloes have flowered and disappeared. As we look up it to the north we have on our right a tall hedge with a fine growth of *Myrsine africana*, with a leaf like the Box and a pretty blue berry; and turning and looking south we see at the end of the path a clump of immense bamboos (*Arundinaria Hookeriana*).

Behind the Eagle a grassy path leads westward, gently sloping upwards. This is lined on each side with a large number of vigorous well-grown trees and shrubs planted within the last twenty-five years. Beginning on the left we find *Cassia corymbosa*, with deep yellow flowers in abundance, and another Cassia with a smaller leaf. Opposite on the other side of the path, there are *Pittosporum bicolor*, *Melicytus ramiflorus*, when it flowers flowering yellow along the wood, and *Bowkeria serrulata*, in appearance like a Buddleia. Beyond these a Tasmanian Banksia and *Idesia polycarpa* with large green leaves and red leaf stalks. On the other side are a big Psoralea, a Callistemon with a pink flower, and a tremendous growth of Abutilon; and further west *Veronica arborea* with flowers of pale blue, *Entelea arborescens* from New Zealand (rather like *Sparmannia*), and *Evodia hupehensis*, a bush like an elder from Central China. Opposite on the north side of the path are *Banksia grandis* and *Daphniphyllum glaucescens*. On the south side again are *Royena lucida* and *Protea mellifera*, and opposite to them a fine tree of *Calodendron capense*, the Cape Chestnut which flowered (for the first time in Great Britain) in 1945. Further west still we find *Olearia Traversii* (a splendid wind break), *Olearia Solandri* and *Pittosporum Fairchildii* with its large seed boxes.

Retracing our steps along the Long Walk we will just glance at Upper and Lower Australia.

In Upper Australia we see a very thin, tall specimen of the Kauri pine *Dammara australis*, an ancient *Leptospermum lanigerum*, the Lancewood, *Pseudopanax ferox* (and a fierce-looking plant it is!), the Tetoke (*Electron excelsa*), *Tristania conferta*, *Quercus incana*, *Laurelia novae-zealandiae*, and a big *Eucalyptus obliqua* with great loose strips of stringy bark.

The most striking object in Lower Australia is a big *Araucaria Bidwillii* with a Smilax creeping over it. There are also flourishing plants of *Myrsine Urvillei*, *Senecio perdicioides*, *Styrax japonica*, *Pittosporum eugenioides* and *P. tenuifolium*, *Podocarpus Totara* and *Drimys Winteri*.

Returning to the Long Walk and proceeding eastwards we may keep our eyes open for seedlings. One of the charms of the garden is the readiness of plants, thoroughly at home in themselves, to produce seedlings. The soil is a natural mixture of sand and peat which seedlings love. Here, for example, are the charming little offspring of the Karaka with their shiny leaves. The Puka itself has a seedling across

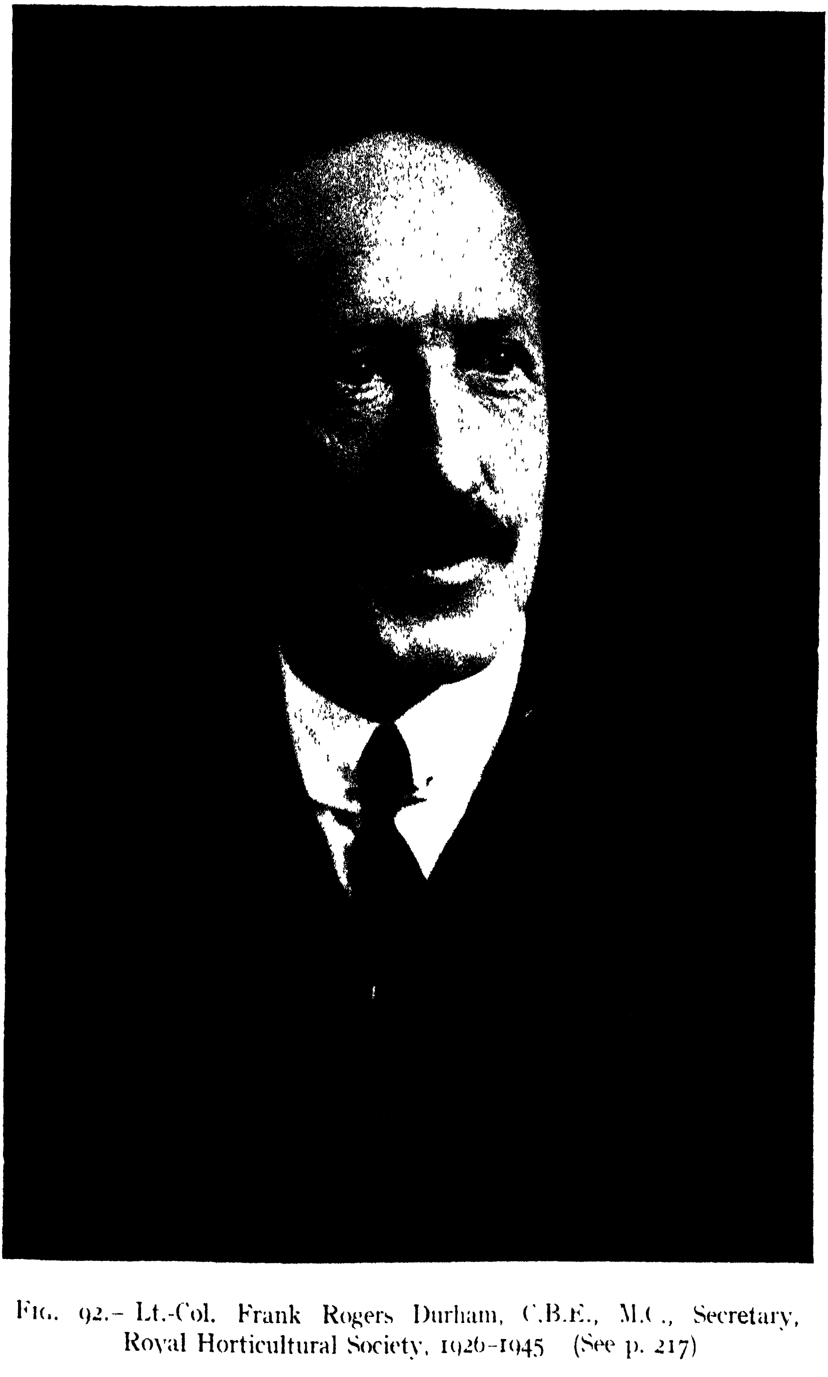


FIG. 92.—Lt.-Col. Frank Rogers Durham, C.B.E., M.C., Secretary, Royal Horticultural Society, 1926–1945 (See p. 217)

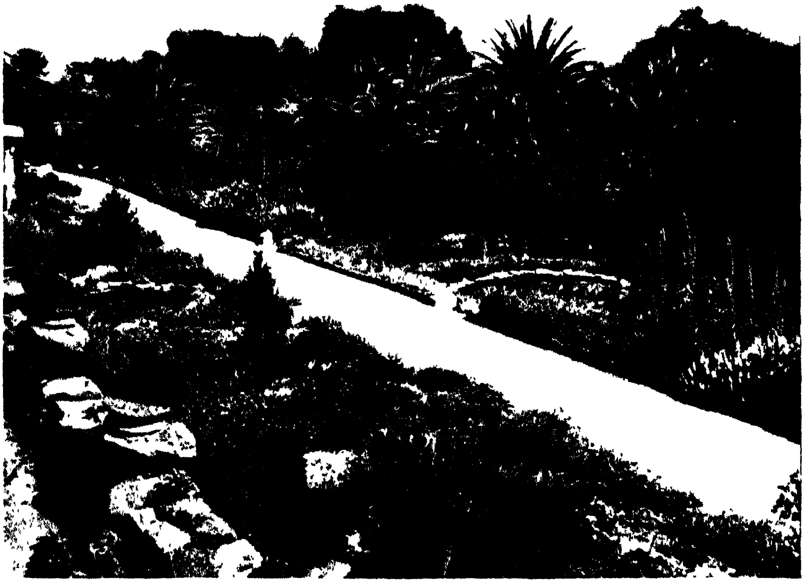
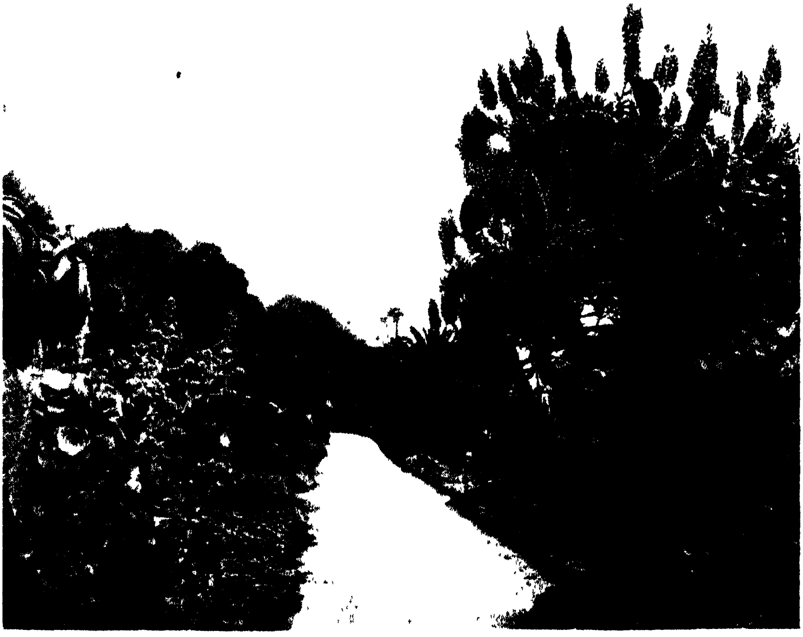


FIG. 93.—The Middle Terrace with *Phoenix canariensis* and *Metrosideros tomentosa.* In the foreground *Echium scilloweensis* (hybrid) on the right, and Gazanias on the left



Photos, James Gibson]

THE GARDENS AT TRESCO ABBEY

FIG. 94.—The Middle Terrace from the Western end, with *Aconium canariensis* on the left and *Echium callithyrsum* on the right (See p. 229)

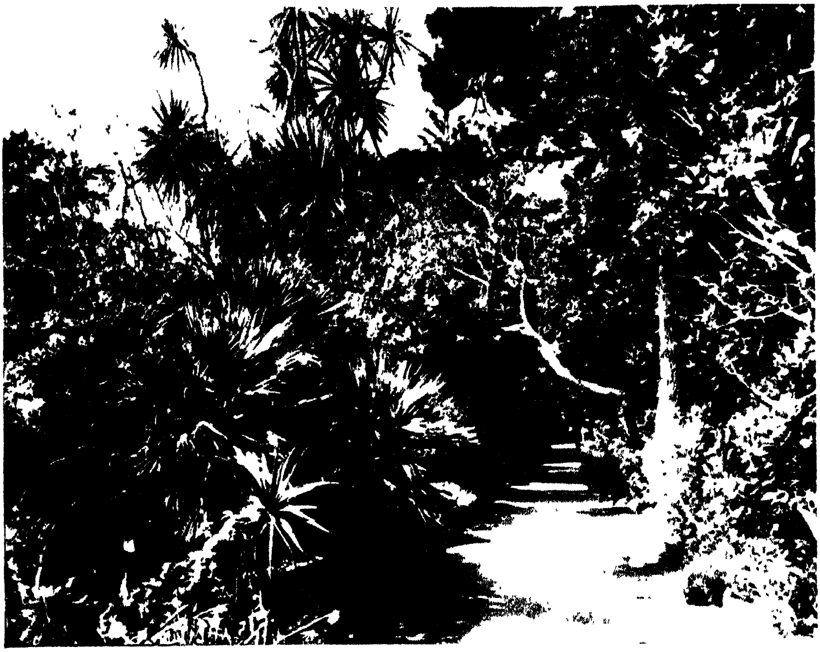
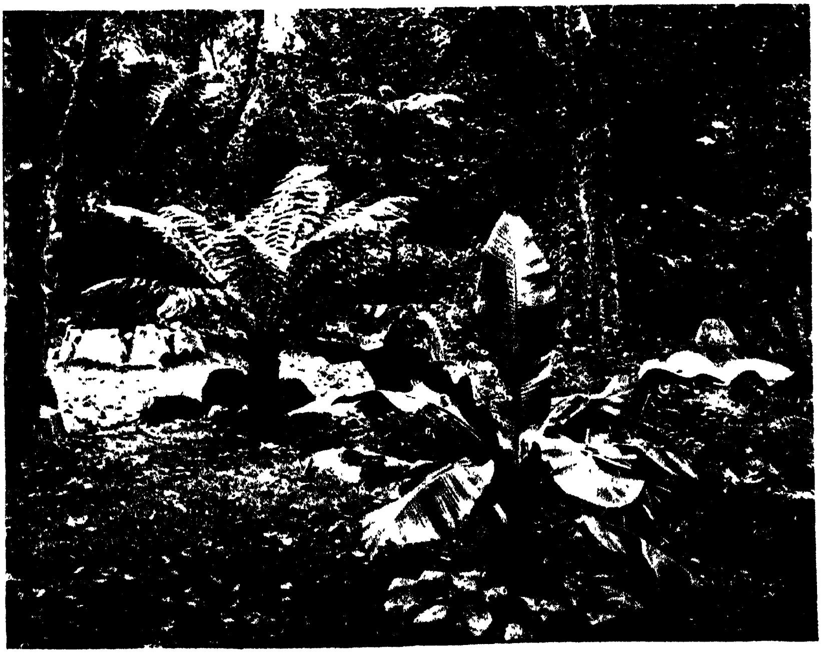
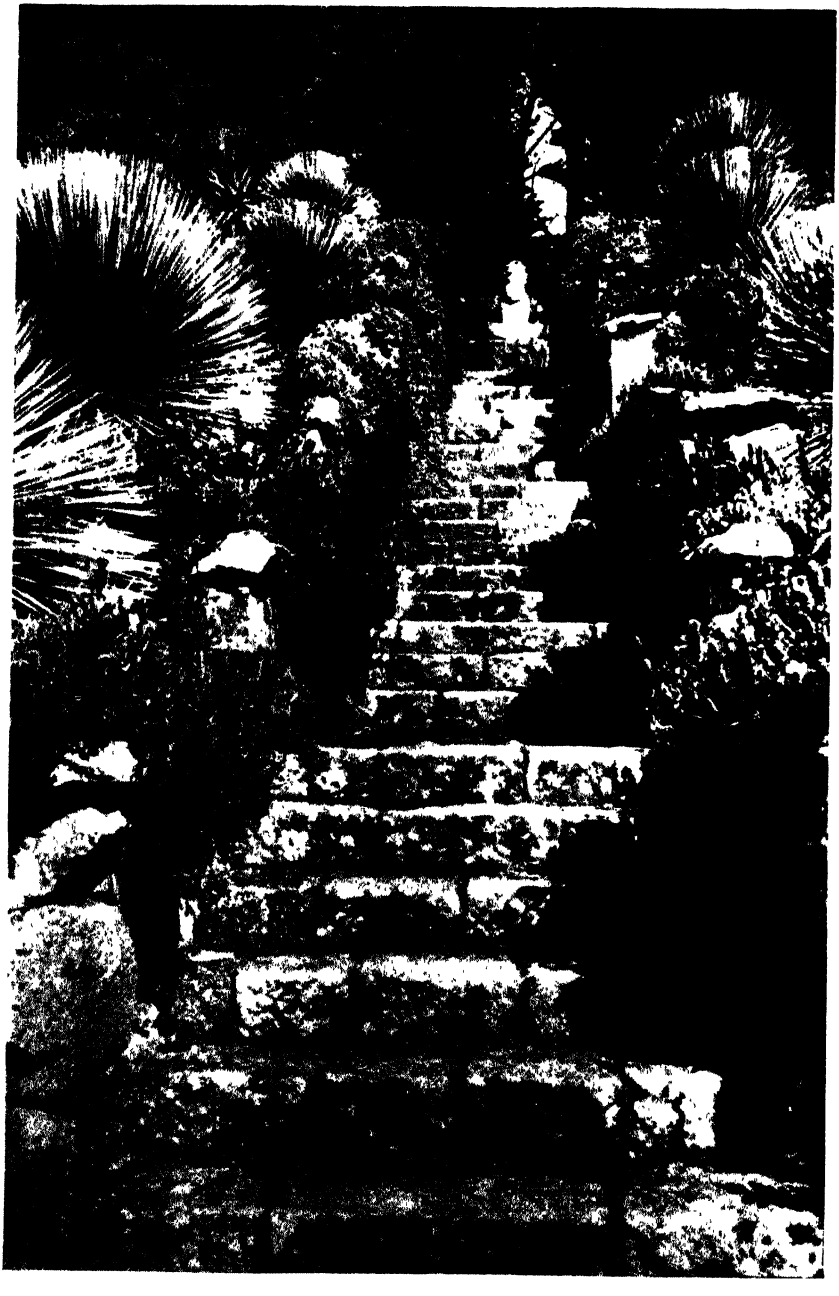


FIG. 95. The Long Walk with *Sophora tetraptera* leaning across the path and behind it the Puka (*Meryta Sinclairi*). on the left *Chamaerops humilis* with Aloe in front



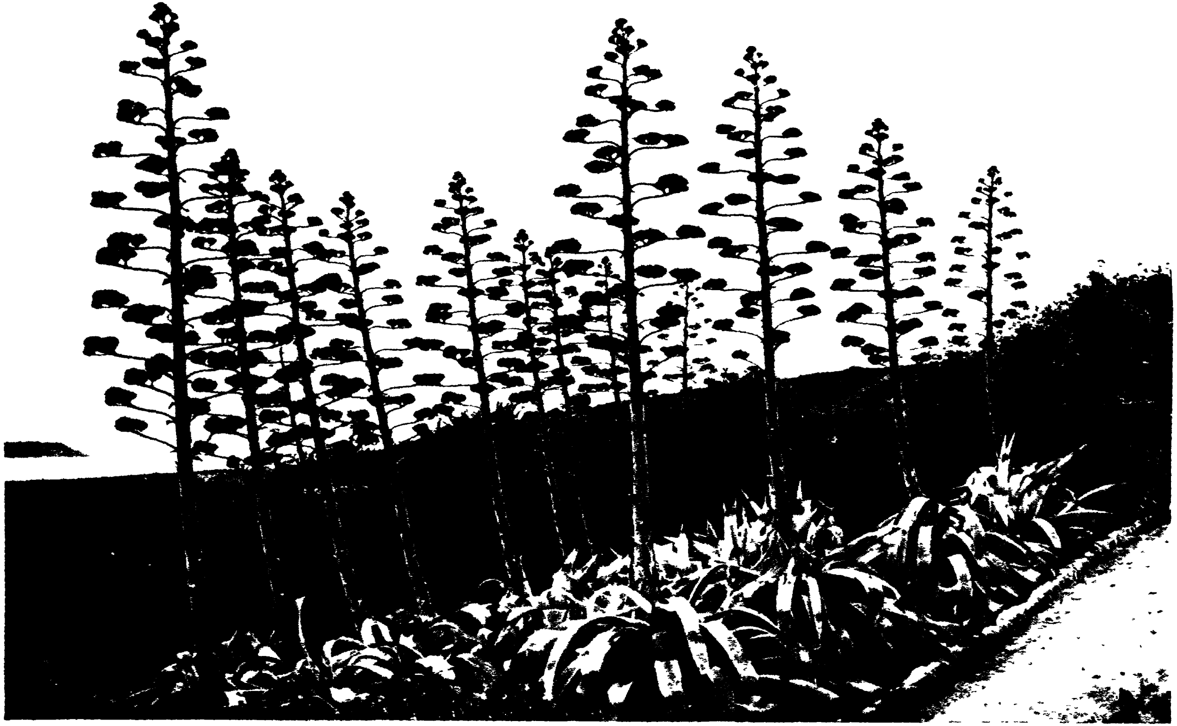
THE GARDENS AT TRESCO ABBEY

FIG. 96.—*Dicksonia antarctica, Cyathea medullaris* and *Musa Ensete* (See p. 235)



THE GARDENS AT TRESCO ABBEY

FIG. 97.—Neptune Steps with *Dasylirion acrotrichum* also Mesembryanthemum and *Crassula coccinea*



THE GARDENS AT TRESCO ABBEY

Fig. 98.—*Aloe americana* in bloom

Photos. Mason, Dublin]

CONIFERS AT MOUNT USHER

FIG. 99.—*Cunninghamia sinensis* in centre at back with *Davidia involucrata* on left in front of *Libocedrus decurrens*

CONIFERS AT MOUNT USHER

FIG. 100.—*Cupressus nootkatensis pendula*

FIG. 101.—*Pinus Montezumae* (See p. 239)

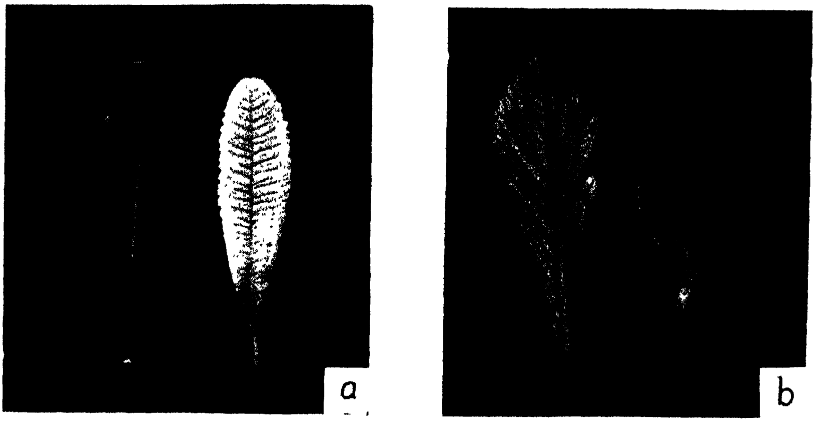


FIG. 102.- (a) Lower surface of leaves from different plants of *Primula denticulata*, (left) non-farinate, (right) heavily farinate. (b) Lower surface of a leaf of *Primula verticillata* (left), heavily farinate and of an Auricula leaf (right), farinate on its edge (See pp. 241 and 244)

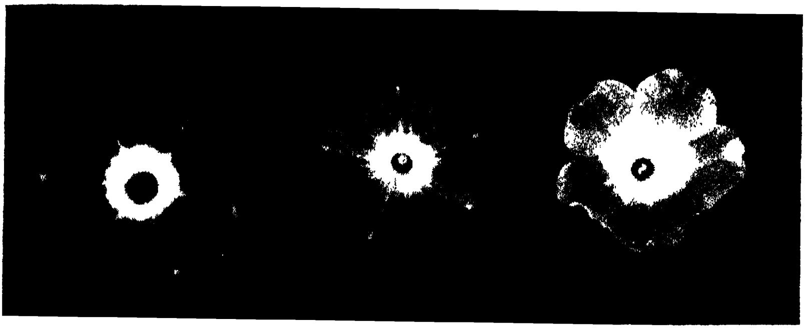
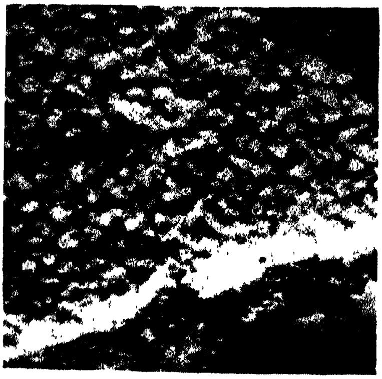


FIG. 103.—Flower of an Auricula (left), whose eye is completely covered with farina, and two flowers of *Primula alpicola* var. *violacea* (centre and right) with a central circle of farina and lines connecting it with the centre of the corolla lobes (See pp. 243 and 245)



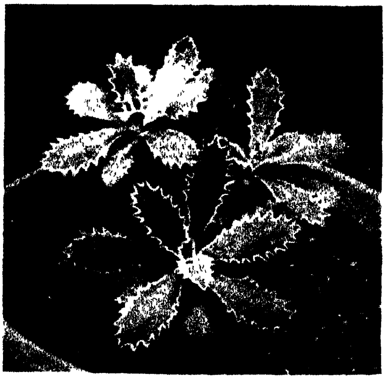


FIG. 104.—Microphotograph of a small portion of the lower surface of a leaf of *Primula frondosa* in which the farina-bearing glands and most of the epidermal surface is concealed by farina (See p. 242)

FIG. 105.—Plant of *Primula marginata* with heavily-farinate leaf margins (See p. 244)

the path, and there are Pittosporum seedlings right and left, and Echium seedlings a little farther on. Veronicas and Coprosmas are great self-seeders too; and sweet-scented Freesias, Erigerons with their button Daisies, Evening Primroses, as well as a number of other pretty things already mentioned, count at Tresco among the weeds.

When we reach the Lighthouse Walk again we turn right and go along it towards the south. On our right we pass *Senecio grandifolius*, clumps of *Galtonia* (*Hyacinthus*) *candicans* with their white bells, *Phyllocladus trichomanoides*, some *Phillostachys aurea*, the Bamboo with the golden bark, and on our left a clump of *Moraea Robinsoniana*, the Wedding Iris, from the Lord Howe Islands.

Before we come to the Lighthouse brazier itself we turn right and follow a curving path towards the south-west. We have left behind us (to the north-east) a plot of ground, now rather overgrown, known as the Nursery Garden, where there are a number of Olearia not hitherto mentioned (*angustifolia, avicenniaefolia, erubescens, nummularifolia*), *Pittosporum Dallii*, a very tall *Pittosporum Kirkii*, *Hoheria crataegifolius*, *Berberis congestiflora* from Chile, *Euonymus fimbriatus* from the Himalayas, *Elaeocarpus cyaneus* from Queensland, and an *Araucaria Cookii* which has become throttled; a *Euphorbia* from the Canary Islands and *Psoralea pinnata* from South Africa. This collection lies just south of the eastern end of the Long Walk, and, as the countries named indicate, it is a remarkably cosmopolitan collection.

As we proceed westward we have to the south of us the glasshouses and frames where cuttings and seedlings are brought on and a number of tender ornamental plants are grown. Notable among them are many species of Cactus, and the *Gloriosas* (especially *G. Rothschildiana*) from which flowers are cut for the house. We enter the heavy shade of immense trees of *Cupressus macrocarpa* var. *Lambertiana*, and the path itself is often under water after heavy rain. *Woodwardias* spread themselves over the ground, and rising above and beyond them are the tree ferns: various *Dicksonias* with huge fronds and *Cyatheas* (whose fronds are more huge still), with an occasional *Haematelia*. (Fig. 96.) At length we reach a kind of verandah, known as Valhalla, because it contains some seventy old figure heads or relics of ships wrecked among the Islands Leading out of it is an office where the visitors' book is kept and an opportunity is given to contribute to the Dorrien-Smith Nursing Association which provides the Islands of Tresco and Bryher with an indispensable nursing service.

A few words must be added with regard to the woodland above the garden to the north. A little path from the eastern end of the Top Terrace leads out into it. Along this path we find, among other plants, an Olearia hybrid produced in the garden (*stellulata* ×), Tritonia, a Kangaroo Paw (*Anigozanthos*), with Diosma, *Coleonema rosea*, *Yucca aloifolia*, and a large *Lonicera Hildebrandtii* with its great trumpets of flower on the rocks at the back, through an opening in which we pass out into the woodland.

Turning westward we soon come to a point where the view southward over the garden below and over the sea and the islands beyond is perhaps the finest of all the views of Tresco. The planting in the woodland is steadily increasing in interest. Major DORRIEN-SMITH has put out here a number of Proteas (e.g. *Suzanniae, neriifolia,* and red and white *latifolia*), Acacias (*decurrens, brachybotrya, floribunda, pulchella, cultriformis* etc.) and other trees and shrubs ; and a number of seedlings are springing up on their own account. Specially noticeable are several *Metrosideros* seedlings growing out of the trunks of fallen Conifers.

A comparison suggests itself between the Tresco Garden and the Garden established by Sir THOMAS HANBURY at La Mortola on the Riviera (1867). Tresco has more wind and rain. La Mortola is drier and much hotter in summer. There is little frost at Tresco, there is still less at La Mortola. La Mortola is considerably larger—about 112 acres, a great part of which is picturesque wooded ravine. The soil at Tresco is sandy and peaty with one band of clay crossing it from north-east to south-west. That at La Mortola is heavy clay. Many of the same species appear in both gardens : *Acacia* (flowering more luxuriantly at La Mortola), *Aeonium, Echium, Hymenosporum, Iochroma, Lagunaria, Medicago, Pelargonium, Phoenix canariensis, Polygala myrtifolia, Rosa Banksiae, Greyia Sutherlandii, Hakea, Strelitzia, Tristania* and so on. Aloes and Agaves are fine at Tresco, but far more numerous and dazzling at La Mortola. On the other hand Mesembryanthemums are far finer at Tresco. Major DORRIEN-SMITH has supplied La Mortola with a number of Australian, New Zealand, and other plants : for example, *Kniphofia Northiae, Puya chilensis,* Veronicas (*carnosula* and *vernicosa*), *Pittosporum umbellatum* and *P. patulum.*

Cacti are naturally far more in evidence at La Mortola, and Metrosideros far more at Tresco. *Pittosporum Tobira* and *Coronilla glauca* have naturalised themselves at La Mortola ; but Tresco lends itself more freely to natural seedlings of most kinds. *Lapageria rosea* is not a success at La Mortola : Tresco has no Jacarandas, with their masses of deep blue flowers, which are one of the striking features of La Mortola in July. La Mortola has suffered greatly through the recent war, not so much from actual damage as from unavoidable neglect. Through the persevering efforts of Major and Mrs. DORRIEN-SMITH and their accomplished Head-gardener, Mr. W. G. ANDREWS, the Tresco garden happily has suffered comparatively little. To the great kindness of the Major I owe many delightful days in his garden, and to his patient instruction and that of Mr. ANDREWS I have been constantly indebted in drawing up the foregoing account. Much has been omitted, but I hope enough has been set down to give a bird's eye view of a garden which must be of unique interest for British gardeners.

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THE CONIFERS AT MOUNT USHER, CO. WICKLOW

By Commander F. Gilliland

UNLIKE the east coasts of Scotland and England, where conditions do not favour success for tender trees and shrubs, the east coast of Ireland is better situated. Absence of wind, frost and a moderate rainfall unite and provide suitable conditions.

Coming from the north, in County Down there are good gardens at Mount Stewart, Rowallane and Castlewellan, but it is a matter for regret that the celebrated collection formed at Rostrevor by the late Sir John Ross of Bladensburg has not been kept up since his death in 1926.

County Wicklow, known as the " Garden of Ireland," has several good gardens, including Lord Powerscourt's fine place at Enniskerry, and others like Kilruddery near Bray. Further south and close to the coast is Kilmacurragh, where a fine collection was formed by Thomas Acton, who died in 1908, and to which a notable tribute was paid in the second edition of Veitch's *Manual of Coniferae.* In discussing the tender *Cupressus lusitanica,* we find the statement " where it is associated with some of the rarest and most beautiful Conifers to be seen in Great Britain."

Mount Usher, the residence of Mr. E. H. Walpole, is near the village of Ashford, 29 miles from Dublin, from whence about six buses run on week-days, but none on Sundays. The gardens are open to the public except on Saturdays, Sundays and Bank Holidays. A feature of the gardens, which cover 16 acres, is the shallow river

Vartry which divides it, and is crossed by three small suspension bridges. It is well sheltered, with sandy-loamy soil, and 2½ miles from the sea. The rainfall is about 40 inches. This area is sheltered by the high chain of the Wicklow Mountains running north and south and reaching over 3,000 feet. The heights given in brackets are measured in 1946 by a clinometer for trees over 12 feet high. Most of the trees are labelled.

Entering by the public gate on the main road, and close to the gate, are several plants of *Thuya occidentalis lutea* (25) showing in early autumn the distinct yellow oblong cones. Near these is *Juniperus Wallichiana* (18) a rare tree. In the border opposite the Kitchen Garden wall are several *Cupressus Duclouxiana* (30).

Turning to the left just before reaching the river, a tree of *Taxodium ascendens* var. *nutans* (13) is growing close to the water. This is very distinct in early spring when the young vertical shoots are gradually getting longer. It is a very rare tree, not recorded as growing in these islands in the 1931 Conifer Conference report. It is in commerce. On the other side of the path is a young tree of *Pinus Montezumae* (11) raised from the large tree growing here ; also a form of *Thuja orientalis* called *compacta Hillieri* (4) a dense globose bush, which was bearing yellow cones in September 1946. There are also *Thuja orientalis* var. *semperaurescens* (5) and *Thuja occidentalis* var. *ericoides* (7) a soft bushy form with several leaders.

Turning back, there are some interesting plants growing near the summer house. These include several of the slow-growing *Pinus leucodermis* (32). These cone freely. Close by are two trees of *Pseudo-larix Kaempferi* (12) a difficult tree to establish, showing very long distinct foliage in summer and fine autumn colour. What must be one of the oldest plants of *Juniperus Coxii* is 14 feet high, a bushy tree, with long pendular branchlets, reaching 2 feet, and five stems. This is of interest from Mr. BEAN'S statement that this is a single stemmed tree, and from the much larger growth, up to 35 feet, made by it at Exbury. The Mount Usher tree is about twenty-three years old. Close by is *Picea Omorika* (36). Here are *Cupressus Lawsoniana* var. *Stewartii* (18), a good colour, and var. *filifera* (12). One now comes to an open piece of ground with the river on the left and a line of Conifers on the right, where are *Abies bracteata* (47) and *Picea morindoides* (31). *P. pungens glauca* (25) does well at Mount Usher and does not show the usual thin, brown foliage. There is also *Cupressus Lawsoniana* var. *erecta viridis* (30).

Behind is a bit of thin woodland. Here is a big plant of *Juniperus Cedrus* (39) and *Agathis australis* (7). A bigger plant, up to 30 feet had died. On the right are *Abies recurvata* (22), *Picea asperata* (25) and *P. rubra* (30). Moving towards the river, on a lawn opposite the house are some interesting trees, a big *Cupressus nootkatensis pendula* (56) (Fig. 100), *Sciadopitys verticillata* (37), coning freely, and two *Cunninghamia lanceolata* (54), fine trees in good health, also var *Konishii* (5) with much smaller leaves, *Pinus canariensis* (12) and a well-grown bushy tree of *Tsuga canadensis pendula* (12 × 12). Close to the river and a small bridge is a curious form of Weeping Cyprus, probably *Cupressus Lawsoniana*. The leader is much bent over and nearly reaches the ground, 10 feet high and 11 feet long, a peculiar shaped tree. Here are also a fine *Tsuga Albertiana* (72), *Libocedrus decurrens* (70), *Picea hondoensis* (76), *Cupressus Lawsoniana erecta viridis* (75), an unusually large tree, with less tendency to get bare at the bottom, and *Thuja dolabrata variegata* (34). There are a good many trees of *Athrotaxis selaginoides*—the best one, 41 feet, is on the right of the drive—a beautiful well-furnished tree, close to *Cryptomeria japonica* var. *elegans*, 54 feet, quite fastigiate.

Moving still further, on the same side of the river, a broad grass drive called the " Old Rose Walk " divides the garden into two parts. A number of good Conifers will be found on the left side; special attention is directed to the large tree of *Pinus Montezumae*, measuring 54 feet high, with a spread of 48 feet, and a girth of 6½ feet at 5 feet from the ground (Fig. 101). This is one of the largest and finest trees of this species, and in my view the best Conifer at Mount Usher. Its appearance is most impressive. Its shape makes it like a large bush. When the young leaves open they rise at angles of 45 degrees, the older leaves droop at the same angle, giving a very sturdy appearance. The tree cones, but for some reason the cones of the past two years did not produce fertile seed. Some experts are not too clear about the true *P. Montezumae*, and confuse it with var. *Lindleyi* and var. *Hartwegii*, but I have no doubt that the Mount Usher tree is the type. It was planted about thirty-eight years ago, at a height of 4½ feet. Several promising young trees have been raised from its seed, and planted at Mount Usher. Near it is another Mexican Pine, *Pinus patula* (31), not so hardy as its neighbour and subject to seasonable change of foliage. It gives a pleasing contrast with its pale green slender leaves to the stiff blue green leaves of *P. Montezumae*.

Podocarpus chilinus (30) does well, also *Fitzroya cupressoides* (36) with long pendulous branchlets up to 4 feet, and coning freely. *Callitris articulata* (18) suffered in the frost of January 1945, but has recovered. Its cones are closely clustered round its branches. *Picea orientalis* (66) is growing near some large Eucalypts.

At the end of this section is *Abies concolor* var. *Wattezii* (50), an unusually large specimen of this rare variety. The stem has been cleaned up for 15 feet. There is also a large specimen of *Cupressus arizonica* (50). There is near it *C. funebris* (31) and a large specimen of *C. Lawsoniana*, ' Triumph de Boskoop ' (57).

Near the far end is a large specimen of *C. Manabiana* (47), a much larger tree than is recorded elsewhere. Other good trees at this point are *Athrotaxis cupressoides* (4), *Phyllocladus trichomanoides* (10), *Tsuga Martensiana glauca* (25), *Podocarpus nubigena* (4), *Juniperus chinensis* var. *aurea* (32), *Pinus parviflora* (22), *Cedrus atlantica glauca* (63), *Prumnopitys elegans* (25) and several unusually good *Cupressus Lawsoniana* var. *Wisselii* up to 47 feet, and *Pilgerodendron uviferum* (6).

Crossing the river one meets another broad grass drive leading towards the house. A plant of *Cupressus Lawsoniana* var. *tamarisci-*

folia, but called here 'Tilgate Variety,' measures 13 × 16 feet spread, with flat top. On the left hand side is a 25 feet specimen of the rare *Pinus palustris*, the valuable Pitch Pine of commerce with the south-eastern United States as its home. Even at Mount Usher this tree suffered in the frosts of January 1945, but it has now recovered, and its leaves are 11 inches long. It is a very fastigiate tree. Another *Juniperus Coxii* (9) is close to the tennis court, and near it grows a good specimen of the form of Lawson Cypress, known as *elegantissima* (15), a distinct tree of a striking habit and colour. There are also *Cupressus macrocarpa* var. *lutea* not often seen, a bushy tree 42 feet high; a curious broad-shaped plant of *C. lusitanica* var. *glauca pendula* 14 × 27 feet, *Libocedrus chilensis* (17), *Abies Veitchii* (29), *A. Koreana* (12), of unusual height, another *Juniperus Coxii* (12) with long pendulous branchlets, 2½ *feet*, bearing fruit and *Picea Breweriana* (14). On the opposite is a small plant of *Abies concolor* var. *candicans* (6). Its colour is quite distinct from var. *Wattezii*, being a peculiar glaucous blue. Close to it a good young plant, with fine pale green leaves of *Pinus Pseudo-Strobus* (11).

Close to the house is a 14-foot plant of *Taiwaina cryptomeriodes* which is noticeable for its blue colour. It was only introduced in 1920 and is very rare. The fastigiate form of Lawson Cypress, taking its name from the neighbouring estate of Kilmacurragh, has reached 32 feet, and close to it is another *Cupressus Duclouxiana* (30) in good health and a very fine young plant of *Pinus Montezumae* (11) grown from seed from the large tree described earlier.

Moving still further on this side of the river is a small plant of *Phyllocladus trichomanoides* (10) bearing curious flowers in September 1946. Close to the house, at the front door, are three large trees, *Tsuga Albertiana* (80), *Sequoia sempervirens* (75) and *Libocedrus decurrens* (65). On this side of the river are several deciduous Cupresses, *Taxodium distichum*, up to 40 feet. There are also good specimens of *T. distichum*, bearing fruit, and *Gingko biloba*. From this article it will be seen that the Conifers at Mount Usher comprise many interesting trees, many of which are of unusual size. All are in good health.

THE SECRETION OF FARINA BY SPECIES OF PRIMULA

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OF the 500 or more species and subspecies of the genus *Primula*, at least one-half bear minute glandular hairs which secrete a white or yellow powder, commonly designated as farina. With the exception of the closely related genus *Dionysia* I know of no other genus of flowering plants whose species yield similar secretions. Certain species of at least two fern genera, *Pityogramma* and *Notholaena*, bear similar hairs producing similar products. Farina formation is of taxonomic importance in defining the genus and the various sections into which it has been divided.

These secretions are of a different nature from the wax-like substances which appear on the epidermal surfaces of the fruit, stems, and leaves of a great variety of plants, some of which, such as the wax palms, the Candelilla (certain Mexican species of *Euphorbia*) and the Wax Myrtle (*Myrica cerefara*), are, or have been, of commercial importance as sources of wax. These latter secretions cover the entire surface with an impervious layer of wax and appear to ooze through the walls of the epidermal cells and, in certain species, build up layers several millimetres in thickness. Primular secretions, on the other hand, are powdery, loosely adherent, and secreted by hairs composed of a terminal gland and usually a single supporting cell.

In botanical literature Primula secretions are frequently described as wax-like, but in 1915 HUGO MÜLLER * showed that the secretion of *Primula pulverulenta* was composed of flavone ($C_{15}H_{10}O_2$) mixed with much smaller amounts of substances to which the term wax-like could be properly applied. Flavone is pure white and easily crystallizable. It melts at 98° C., is insoluble in water, but readily soluble in most of the common organic solvents. It has not been found in any of the other products derived from plants although several of its hydroxy derivatives occur in the tissues of species belonging to a variety of genera, some of which have been used as yellow or red dyes. Later, BRUNSWICK † showed by the use of microchemical tests, largely made on herbarium specimens, that the secretions of twenty-five of the species of *Primula* and three of those of *Dionysia* gave qualitative tests for flavone. Since many of these secretions are yellow it is clear that we need further information concerning their chemical nature.

Unfortunately, most of the species yield very little farina-bearing tissue, the seed of many of them is difficult to obtain and others are difficult to grow. During the past twenty years I have been able to grow a sufficient number of plants of twenty-two of them to make a preliminary study of their secretions possible. I will first outline the results of my work on the Himalayan *Primula denticulata*. One form of it, to which the name *cachemeriana* has been given, was reported to be distinguished by the abundance and the deep yellow colour of its farina. My experience in growing plants from several lots of seeds indicates that the yield of farina is a peculiarity of the individual plant, and that differences in the colour of the farina are negligible. All of the plants produced some farina on the upper portion of their scapes and the calyces ; nearly all produced some on the leaves which surround the early flowering scapes, but little or none on the main crop of leaves formed during the summer. A few plants produced leaves which were heavily farinate, as shown in Fig. 102. It is noteworthy that whereas the farina-bearing hairs are closely spaced on heavily farinate leaves they become widely separated as the leaves enlarge, clearly indicating that additional hairs are not formed as the leaves approach maturity. Further, farina formation begins early in the development of the hairs and ceases long before the leaves attain their full growth.

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* Jour. of Chemical Soc. (London), 107 (1915), 872.

† Berichte Akad. Wissenschaft (Wien) [1], 131 (1922), 221.

An examination, at a magnification of about 100 diameters, of a young leaf in which farina formation has begun, shows the bare upper surface of the glands which appear like very small vacant spaces. These are surrounded by rings of grains or rod-like or thread-like particles of farina. Later, these accumulated fragments cover the top of the glands, forming snowball-like masses which may fill most of the space between the hairs and completely conceal the epidermis (Fig. 104). These fragments do not show any indication of crystal faces although they appear to be homogeneous.

By rinsing farina-bearing leaves with a few drops of alcohol or chloroform the fragments dissolve, leaving the bare two-celled hairs in full view. By studying the edges of gland-bearing leaves of different species, variations in the form of the terminal gland and the form and length of the supporting cell can be observed. Diagram 1 shows sketches of the hairs of four species. No evidence of a collapse or break in the wall of the terminal gland was found, even on hairs which had long ceased to produce farina. Apparently it diffuses through the wall of the gland just as wax diffuses through the epidermal cells of producing tissue.

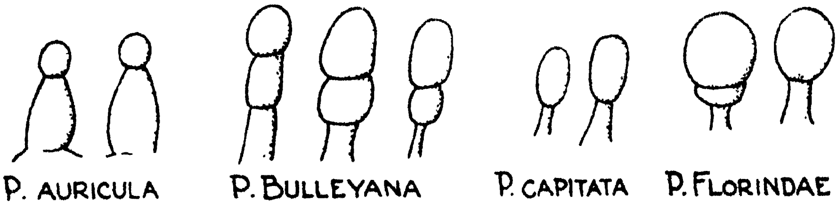

Diagram 1.—Sketches of farina-producing hairs of four different species of Primula.

In order to separate farina, for chemical examination, from farina-bearing tissue it was necessary to use solvents The small amounts of such tissue available and the sticky nature of the farina made mechanical methods of separation out of the question. Benzene was found to dissolve the farina of all the species studied. The resulting extract, on evaporating to dryness, gave a residue consisting of crystalline compounds as well as pigments and other amorphous substances. Extraction of non-farinate leaves of *Primula denticulata* gave some chlorophyll and other non-crystalline products, but no flavone or wax. The details of the methods used in studying the composition of these extracts have been published elsewhere.[*] These studies showed that the farina of twenty-one of the species contained at least 75 per cent. of flavone and variable amounts of wax-like substances which could not be identified because of the small amounts available. The species studied were: *alpicola* var. *violacea*, *Beesiana*, *Bulleyana*, *burmanica*, *capitata*, *chungensis*, *denticulata*, *Florindae*, *frondosa*, *helodoxa*, *Jaffreyana*, *japonica*, *malacoides*, *marginata*, *Mooreana*, *pulverulenta*, *pulchelloides*, *Sherriffae*, *sikkimensis*, *verticillata*, and the Auricula.

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[*] Jour. of American Chem. Soc., 67 (1945), 491

A small amount of an undescribed dihydroxy-flavone was also separated from the secretion of *Primula denticulata*. It forms orange-yellow, monoclinic crystals which melt at 228 ° C.; it is obviously the source of the yellow colour of that secretion. There is a striking difference between its crystal habit and that of flavone. From the secretion of *Primula verticillata* I separated a light yellow compound in the form of lath-like crystals which gave analyses corresponding to the composition $C_{15}H_{10}O_3$. Its composition and other properties are clearly those of 5-hydroxy-flavone, which was synthesized by SUGASAWA.[*] It was also found in the secretion of *Primula imperialis* var. *gracilis* by KARRER and SCHWAB.[†] I also found a third yellow compound the secretion of *Primula Florindae.*

The secretion of *Primula Forrestii* belongs to a somewhat different category. Its petioles and the prominent veins on the lower surface of the leaf blades bear an abundance of long, three- to six-celled hairs, which terminate in small spherical glands. These glands collapse as the leaves approach maturity and the sticky substance which they discharge soon becomes dark from particles of dust and impart a notable stickiness to the foliage. Similar hairs, some of which bear glands, are found on many of the species which do not bear farina, such as *Primula sinensis* and *Primula cortusoides*. The spaces between the veins on the lower surface of the leaves of *Primula Forrestii* are covered with two-celled, glandular hairs which give rise to a white secretion. The particles of which it is composed suggest those of *Primula denticulata*, but they stick together more tenaciously and are not powdery. This secretion was found to contain some flavone, but its main components are wax-like substances which could not be resolved into pure compounds.

Other types of glandular hairs are found in the genus. *Primula obconica* forms, in addition to very long, pointed, many-celled hairs, smaller two to four-celled ones topped by glands which produce "primin"[‡], the compound to which the rash-engendering property of the leaves of this species is due. *Primula Allionii*, bears, on its upper leaf surface, long-stalked hairs with pear-shaped glands which collapse as the glands mature and make the leaves somewhat sticky. Apparently this is due to a water-soluble, colourless substance. *Primula pedemontana* bears conspicuous red hairs, which are composed of a small terminal gland and a long supporting cell which is broadened at its base like that of the Auricula.

Attempts to show that farina is of physiological importance as a device for the protection of growing tissues from excessive moisture and light are not convincing. It occurs more frequently on the calyx than on any of the other organs ; in several species of the Candelabra section only the inner surface of the calyx becomes farinate, and its presence is not noticeable until the capsules begin to open. The next most abundant source is the upper part of the scape and the flower pedicels, then the lower leaf surface, the upper leaf surface, and the petals. These facts do not indicate that farina occurs on these portions of the plant especially exposed to the elements. Further, the farina of most of the species is too easily dislodged by falling water to provide effective protection.

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[*] Jour. of Chemical Soc. (London), Part 2 (1934), 1483

[†] Helvetica Chimica Acta, 24 (1941), 297.

[‡] National Hort. Magazine (Washington), 25 (1945), 233.

Farina contributes to the beauty of many species, such as *Primula marginata* (Fig. 105), where it is especially abundant on the edges of the leaves, and *Primula verticillata* (Fig. 102), whose semi-erect leaves are made luminous by a dense coating on the lower and a less dense coating on the upper leaf surface. Similarly the upper surface of the corollas of such species as *Florindae, Waltonii* and *Sherriffae* are pleasantly powdered by coatings of whiteness, which decrease in density in passing from the edge of the tube to the periphery of the limb. In these species it materially modifies the colour of the layer of epidermal cells which it partially conceals. In *Primula Sheriffae* the glandular hairs terminate the papillate cells bearing a blue colouring matter, showing that these structures may originate from cells which are quite different in their nature from the chlorophyll-bearing leaf cells.

The flowers of some of the varieties of *Primula auricula* bear poorly defined circles of farina surrounding the throat of the corolla ; apparently, through cultivation and selection, they have been developed into " paste," that is, nearly perfect rings of farina covering most of the eye of the flowers of the show varieties of Auricula (Fig. 103). The appearance of a ring of farina on the edges of the petals of the white- and grey-edged varieties is more difficult to explain. The discovery of Sir ROWLAND BIFFEN,* that the tissue which supports such rings of farina, as well as the tissue of the green-edged sorts, possesses not only the colour but also the structure of leaf tissue, is of great significance. It seems reasonable to assume that such tissue may retain not only its structure and colour, but also its capacity to form farina-bearing hairs, which the leaves of many of the varieties of the Auricula produce. This theory is supported by the notable tendency of such Auriculas to form dense growths of such hairs on their leaf edges, which tendency is still more strikingly shown in *Primula marginata* (Fig. 105). It is also of significance that the grey and white edges decrease in density in passing from the outer edge to the centre of the corolla lobes. It seems probable that the entire phenomenon of these edgings is due to frondescence, that is, the substitution of leaf-like for petal-like tissue, in the flowers of the edged Auriculas. Although the farina of the paste and edgings is derived from different types of cells, I have not been able to find chemical differences in the farina produced by Auricula leaves and the paste, that is, the farina produced by petals.

The flowers of certain Primulas yield farina in still more elaborate patterns. In *Primula secundiflora* each calyx lobe is outlined by two narrow stripes. In *Primula alpicola* var. *violacea* a farinate area surrounds the corolla tube, but is also connected with each corolla lobe by a central line (Fig. 103).

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* R.H.S. JOURNAL, 67 (1942), 187.

In the absence of proof that farina is of use to the plant it becomes necessary to add these secretions to the long list of organic compounds synthesized by plants which are believed to be by-products incidental to the complex chemical reactions which take place in plant cells. They may be detrimental to the life and growth of plant cells just as the oleoresins secreted by coniferous plants are detrimental. If so, the secreting hairs may be considered part of a mechanism designed to eliminate such secretions from living tissues, as the specialized resin ducts and intercellular cavities formed in the tissues of coniferous plants segregate the oleoresins and prevent them from coming into contact with active growing cells. Such a theory would apply to the various classes of glandular hairs found on many plants whose secretions are semi-solid or liquid.

JOHN ABERCROMBIE (1726–1806)

By F. M. G. Cardew

AMONG the recent acquisitions of the Lindley Library is a First Edition of some interest and scarcity—that of MAWE and ABERCROMBIE'S *Every Man His Own Gardener*. The history of the publication of this book is fairly well known, but that of ABERCROMBIE himself perhaps less so.

He was born in 1726, the son of a market gardener in East Lothian, and after working with his father came to England about 1751 to seek an independent career. Exact dates in his life are difficult to give, as they do not tally in the various accounts that have come down to us; but the general course of events is clear. ABERCROMBIE was employed for a time at Kew—Kew House being then in the occupation of the widowed PRINCESS OF WALES, who with the assistance of Lord BUTE was the actual founder of the Botanic Garden at this spot. Thereafter he passed nearly twenty years as gardener to various noblemen and gentlemen, including Sir JAMES DOUGLAS, Mr. MUNRO, the botanist of Sunning Hill, Lord BATEMAN, and "Squire" ALVAREZ of Hackney. He married, apparently in the 1750's, a young woman who was employed in the household of Sir JAMES DOUGLAS, and had in the succeeding years a family of two sons—both of whom went into the Navy—and sixteen daughters.

He had always been in the habit of making written notes of his observations during gardening, and these no doubt were the foundation of his first book, *Every Man His Own Gardener*, published in 1767. The first edition is rarely to be found, and the Lindley Library is fortunate in having acquired a copy, as mentioned above. But, although it proved the most successful of all his works, ABERCROMBIE did not originally publish the book in his own name. Fearing it might not succeed, he wrote to THOMAS MAWE, Head Gardener to the DUKE OF LEEDS, and offered him £20 for the use of his name as author on the title page. MAWE was flattered and accepted, and *Every Man* was duly published by "William Griffin in Catharine Street in the Strand" as "By Mr. Mawe, Gardener to His Grace the Duke of Leeds, and Other Gardeners," and sold at "4*s.* bound". It was an enormous success, and in the 7th edition, 1776, ABERCROMBIE added his own name on the titlepage as joint author with MAWE, the latter, however, retaining his first place on the titlepage in all later editions. ABERCROMBIE, however, felt that he had made a mistake, and in his numerous later works he hardly ever fails to describe himself on his titlepages as "Author of *Mawe's Gardeners Kalendar*" or "Author of *Every Man His Own Gardener*"; or to refer to *Every Man* in the Preface, explaining that "for particular reasons" he "declined having his name to the book in the first and several succeeding editions," but that it was "wholly the performance of J. Abercrombie." To make his personality still more of a reality to his readers, he began in the 1780's to have his portrait engraved on the titlepages; and the 16th edition of *Every Man* (1800) was embellished with a full-length profile portrait of himself "*Aet* 72," in shovel hat, light waistcoat, and knee-breeches, standing in dignified attitude in a garden, and holding a spade in his hand. This portrait continued to appear as late as the 24th edition, revised by JAMES MAIN in 1839, and the book itself continued to appear in revised editions up to 1879.

In connection with its original publication under the name of MAWE, it may be worth noting that JAMES MEAN, in his 2nd edition, of *Abercrombie's Practical Gardener* in 1817, narrates how, "some time about 1770," LOCKYER DAVIS, the publisher, invited ABERCROMBIE to dine with himself and OLIVER GOLDSMITH, to discuss the publication of a book on practical gardening by ABERCROMBIE, and that the latter agreed on condition that his MS. should be revised and the style improved by Dr. GOLDSMITH; that GOLDSMITH, however, ultimately returned the MS. unrevised, on the score that "ABERCROMBIE's style was best suited to the subject of which it treated"—no doubt perfectly true—and that ABERCROMBIE was much chagrined by the breakdown of the projected collaboration.

If the date 1770 is correct, this tale cannot refer to *Every Man*, published in 1767; but the chronology of MEAN's little Memoir is extremely vague throughout. Actual dates are only given with the qualification "about," except in regard to ABERCROMBIE's birth and events in the last six years of his life, and no date at all is given for the actual publication of *Every Man*. Moreover, G. W. JOHNSON, in his *History of English Gardening*, says that it was his interview with Mr. DAVIS and Dr. GOLDSMITH which induced ABERCROMBIE to turn author, and gives the date of the publication of *Every Man* as 1774. In the Life prefixed to the 3rd edition of the *Gardener's Pocket Journal*, it is even put as late as 1778. If "about 1770" is also pitched too late, and can be taken to cover (say) the years 1765–66, it would be very natural to suppose that it was nervousness arising from this rebuff which led ABERCROMBIE to seek MAWE'S support for the returned MS. in 1767. In any case it left traces throughout his later books in the apologies for his "plain unadorned stile of writing," which he puts forward in his Prefaces.

After the publication of the 2nd edition of *Every Man* ABERCROMBIE accepted an invitation from MAWE to visit him in Yorkshire; but he had never before seen his host, and on meeting a gentleman fully powdered and plentifully bedecked with gold lace, imagined that he was in the presence of the DUKE OF LEEDS himself. MAWE was perhaps still further gratified by the impression he had made on his partner; in any case ABERCROMBIE and he remained friends and collaborated—or at least shared the titlepage—in a gardening dictionary, *The Universal Gardener and Botanist*, which appeared in 1778, and again in a 2nd edition in 1797.

About 1770 ABERCROMBIE had quite given up work as a private gardener, and taken a kitchen and nursery garden near Hackney. He then took for a short time the lease of a public-house at Mile End, which he converted into the "Artichoke Tea Gardens," painting the sign with his own hands, and putting up pieces of "his own humble poetry" here and there about the gardens. This was quite in accord with the spirit of the time, so far as gardens were concerned, but his wife did not like the place, and he therefore sold the lease before long and set up a nursery business at Tottenham. It is uncertain how long he carried this on, but in 1779 he published *The British Fruit Gardener and Art of Pruning*," and in the next ten years poured out a succession of other books on practical gardening, on which he thereafter chiefly depended for his living. Many of them went through a number of editions. They include :—

The Garden Mushroom, 1779
The Complete Forcing Gardener, 1781
The Complete Wall Tree Pruner, 1783
The Propagation and Botanical Arrangements of Plants and Trees, 1784
The Gardener's Pocket Dictionary, 1786
The Gardener's Daily Assistant, 1786
The Universal Gardener's Kalendar, 1789
The Gardener's Vade Mecum, 1789
The Hothouse Gardener, 1789

and *The Gardener's Pocket Journal*—a re-written version of the *Daily Assistant*—about 1789 or 1791. This last rivalled *Every Man* in popularity, reaching its 35th edition in 1857, 50 years after the author's death.

ABERCROMBIE'S name had become known and at some time in this period he was invited to Russia to superintend the gardens of the Empress, and set forth to go; but on "viewing the vast expanse before him," from the Downs, his heart failed him and he suffered the only bout of indisposition that he experienced in over twenty years.

Prudently he gave up the project, and in place of himself sent the useful *Every Man,* "which was much approved of and more copies were soon sent for."

In 1796 he took up his abode at a friend's house in Somers Town, and lived there till his death, occupied chiefly in preparing fresh editions of his books. He also constantly visited Nursery Gardens and the Botanic Gardens about London to keep his knowledge up to date with a view to a new handbook, the *Practical Gardener,* on which he now embarked. He finished the MS of this and sent it to a friend in Cambridge only a few months before his death.

Like Dr. JOHNSON, he became a considerable tea-drinker in his later years, eating practically no meat, smoking his pipe almost continuously, and, as is usual in such cases, attributing his health and strength to these pet indulgences. He had a circle of friends in Somers Town, including several nurserymen, who enjoyed his stories of high life and of his successes with forced vegetables, and his fiddling, to which their families danced. It was, in fact, after an evening with some of these cronies at "a respectable house of public resort," in the neighbourhood of his home, that he met his death; for on returning in the dark he fell down some steps, broke his hip, and after lingering a short time, died without much pain. The date is given variously as April 15 and May 2, 1806.

The *Practical Gardener* was brought out in 1813 by JAMES DONN, Curator of the Cambridge Botanic Garden. There is no doubt this was the friend whom ABERCROMBIE used to visit in Cambridge, by whom he was supplied with the means of livelihood during the preparation of the book, to whom he sent the MS., and who afterwards paid the expenses of his illness and funeral. For, in spite of the success of his books, especially *Every Man* and its wide-spread reputation—his son bought a copy in Madras, and reported that it was in great demand all over British India—ABERCROMBIE seems to have accumulated no means.

He was evidently a simple-minded and unassuming character. His friends and acquaintances described him on his death as inoffensive, honest, cheerful, harmless and upright—in short a "douce cratur" and easy company.

NOTES FROM FELLOWS

Cistuses and Frost

THOUGH we are accustomed to apply the term "Cistus-killing winter," to a season of intense frost, we seem to be as far off as ever we were in our estimation of the respective hardiness of members of the Cistus family. For in 1939–40, and again last February, the endurance of these shrubs disclosed so much diversity that established beliefs as to the reliability of this or that species or hybrid were considerably upset, if not set at naught. That *C. laurifolius* and *C.* × *cyprius* will pass unscathed through frost which utterly destroys *C.* × *purpureus* we know, but I have come to the conclusion that, with most others, the nature of the soil and site and, not least, the method of growing are factors of much influence in deciding their chances of survival in times of trial. *C. ladaniferus* is commonly believed to be one of the least trustworthy, but we have specimens which have endured the severities of '39–40 as well as those of last winter. They are little the worse and their survival can, I think, only be attributed to the fact that these plants have been "grown hard," that is in poor dry soil with full exposure, since those enjoying softer conditions succumbed. Age must also be taken into account, for young plants of this species will often perish from frost which leaves old bushes unaffected.

Regarding the method of growing cistuses referred to I have in mind the benefits derived from close grouping, plants thus grown being so much less vulnerable to frost than isolated specimens that in '39–40, and again last February, some remarkable instances occurred disclosing how massed bushes survived and detached ones were killed. That this massing, particularly with such as the *C. pulverulentus, albidus* and *villosus* groups, helps to shelter the lower parts and roots—incidentally to prevent the soil freezing so hard—is manifest. Tops may be injured but these will often recover after a light cutting-back in spring. Further, this maquis style of treatment is, I think, better for the plant in a general way, notably the bushier sorts. It is their natural manner, it prevents their being loosened by wind and they give a more pleasing effect. A. T. JOHNSON.

TWO NOTEWORTHY SALVIAS

Salvia blepharophylla

I have known and treasured this plant since about 1933, when I first made its acquaintance, under the name *S. Pittieri*. How it came to be distributed under this name I have not been able to discover, but being interested in the plant I looked up the description and came to the conclusion that it could not be true, especially as our plant had survived the winter unprotected—a performance which could scarcely be expected of a species from Costa Rica, within 10° of the equator. In consequence I forwarded specimens to Kew and they have determined the plant as *S. blepharophylla*, a native of the State of San Louis Potosi in north Mexico.

It is one of the most brightly coloured of a brilliant group of species from the same part of the world, all of which help to brighten up the garden from August onwards when colour is most required. In a sunny situation, which by the way it demands, it rarely grows more than a foot or so high. The flowers are large for the family, the corolla tube being ¾ inch long, swollen in the centre and having the large conspicuous lower lip, characteristic of the genus. In colour it is scarlet, the comparisons given in the Horticultural Colour Chart being Monarda, *Pentstemon barbatus*, and Lapeyrousia. The hood is covered with a kind of pubescence of the same colour, giving it a resemblance to the pile of a carpet, and on the calyx are a few short stiff hairs with sticky heads, not unlike the tentacles of the Sundews. The peculiarity, common in the family, of having two ridges of short stiff hairs running down two sides of the square stems and alternating at the nodes, is well marked in this species, and in addition there are long silky hairs at intervals.

The leaves are ovate and dark green, almost glabrous but with marginal hairs and irregular serration. The veins are well marked but much less conspicuous than in most of the Sages. The leaf petioles are relatively long and slender. This species is quite different in habit to the other scarlet-flowered Salvias in cultivation. It is subshrubby but has fleshy underground stolons not unlike a Mint or Lamium, though by no means so invasive. Though it cannot claim to be completely hardy, if planted in a reasonably dry situation it will survive mild winters. All that is necessary, however, to perpetuate the plant, is to lift a clump in autumn, and winter it in a protected cold frame. It will also root readily from cuttings if that method is more convenient, or a quantity is required.

I have so far been unable to trace the introduction of this plant; it is mentioned (as *S. Pittieri*) in *R.H.S. Journal*, **56**, as growing at St. Nicholas, Yorkshire, in 1931, and **60**, at Mount Stewart in 1935. There is also a record of it in GAUNTLETT'S List, No. 98, this does not appear to be dated, but must have been issued about the same time or earlier. Though it has been in cultivation so long it is little known, and I cannot recollect seeing it at Vincent Square.

Salvia neurepia Fernald

Of the scarlet flowered group of Salvias *S. neurepia* is in my opinion infinitely the best, and it is surprising that it is so little known. It is the tallest growing, reaching a height of 6 or 7 feet under favourable circumstances. This fact I learned a good many years ago as I tried it out under the window of a room which we used a good deal. It grew and grew until it threatened to blot out the light completely, and my wife's remarks finally compelled me to use the secateurs, in spite of a really glorious display.

It differs from its ally *S. Grahami* chiefly in its greater height and in its much lighter coloured foliage. One of its most attractive features is its precise and orderly method of flowering. As one inflorescence completes its allotted span, two laterals push out from a node at its base, and rapidly overtop it, each bearing a pair of flowers opening together; the process being repeated from August until frost puts an end to it. With me here in Oxford it has proved hardier and more vigorous than *S. Grahami*; the two were planted side by side and under exactly the same conditions four years ago. *S. neurepia* was 6 feet 6 inches high in autumn 1946 and *S. Grahami* just over 4 feet, the latter having become hard and woody and making little growth. While *S. neurepia* is frequently cut back to hard wood by frost, I do not remember having seen it killed. The flower colour is H.C.C. Carmine 21, a vivid clear colour, as is indicated by the comparisons given in the chart, *Tropaeolum speciosum* and *Tulipa montana*. The flowers are not hooded but present a large flat conspicuous lip. The foliage is strongly and pleasantly aromatic, and FERNALD in his account of Central American Salvias, says that it is sold in the markets of San Luis Potosi, Mexico, its native habitat, as a herbal remedy. The ovate leaves are light green, inclined to be yellowish, the blade being up to 2 inches long, deeply veined, serrate, except at the rounded base. They are not markedly hairy, but softly pubescent on the underside and with petioles about an inch long. When old the wood is also distinctive, as the old bark tends to split and show streaks of green or grey young bark. G. W. ROBINSON.

AWARDS AFTER TRIAL AT WISLEY, 1946

DELPHINIUMS

Delphinium 'Blue Dragon Fly.' **A.M.** July 1, 1946. Raised, introduced and sent by Ernest W. Mooring, Esq., Sandhills, Wormley, Witley, Surrey. A Belladonna variety. Seedling × 'Blue Butterfly.' 4 feet flower spikes 12–15 inches long, side spikes many. Flowers single, 1¾ inches diameter, French Blue (H.C.C. 43); eye pale mauve. Early flowering.

Delphinium 'Crystal.' **F.C.C.** July 1, 1946. Raised, introduced and sent by Messrs. Blackmore & Langdon. Described *R.H.S. Journal*, **68**, 245. (**A.M.** 1942.)

Delphinium 'Elsie Edwards.' **A.M.** July 1, 1946. Raised and sent by Mr. F. A. Bishop and introduced by Messrs. Bakers, Codsall, near Wolverhampton. An Elatum variety. 6½ feet. Flower spikes 22 inches long, tapering, side spikes many. Flowers 2¼ inches diameter, semi-double, inner petals French Blue (H.C.C. between 43 and 43/1) overlaid Petunia Purple (H.C.C. 32/3); outer petals French Blue (H.C.C. between 43 and 43/1); eye large, dark brown.

Delphinium 'Emily Wort.' **A.M.** July 1, 1946. Raised and sent by Mrs. B. G. Wort, 18 Upper Woodcote Village, Purley, Surrey. An Elatum variety. 6½ feet. Flower spikes blunt, 2½ feet long with many side spikes. Flowers 2½ inches diameter; semi-double; inner petals Bishops Violet (H.C.C. 34/2), outer French Blue (H.C.C. 43/1); eye inconspicuous.

Delphinium 'Sonia Hotblack.' **A.M.** July 1, 1946. Raised and sent by H. S. Hotblack, Esq., "Deakes," Cuckfield, Sussex. An Elatum variety. Described *R.H.S. Journal*, **63**, 90. (**H.C.** 1937.)

Delphinium 'Whitethroat.' **A.M.** July 1, 1946. Raised and sent by C. F. Hill, Esq., Westover, Harlington Road, Hillingdon, Middlx.

An Elatum variety. 6 feet. Flower spikes 2 feet long, blunt; side spikes many. Flowers 2 inches diameter, semi-double; inner petals Cornflower Blue (H.C.C. 742/2) with faint blush of Mineral Violet (H.C.C. 635/1); outer as inner without the Mineral Violet flush; eye large, white.

NARCISSI

Narcissus 'Bartley.' A.M. April 2, 1946. Raised by J. C. Williams, Esq., and sent by Col. F. C. Stern, O.B.E., Highdown, Goring-by-Sea, Sussex. A Cyclamineus hybrid. Flowering from March 8 to April 12, 1946. Vigorous with a stiff, erect 18-inch stem above the foliage. Flower 3¼ inches diameter; perianth segments 1⅝ inches long, flat, separated, reflexed, at first Canary Yellow (H.C.C. 2/1) later deepening to Lemon Yellow (H.C.C. 4). Coronal segments 1⅝ inches deep, Lemon Yellow (H.C.C. 4). Flowers 32 in 1945, 37 in 1946 from 25 bulbs.

Narcissus 'Bodilly.' A.M. April 2, 1946. Raised by the late P. D. Williams, Esq., and sent by Messrs. Barr & Sons, 11–13 King Street, Covent Garden, London, W.C. 2. A bicolor Incomparabilis variety. Flowering from April 1 to 19, 1946. Vigorous with an erect 23-inch stem above the foliage. Flower 4⅛ inches diameter; perianth segments 1¾ inch long, flat, overlapping for half their length, white; coronal segments 1⅝ inch deep, expanded at the mouth, Sulphur Yellow (H.C.C. 1/2). Flowers 22 in 1945, 40 in 1946 from 25 bulbs.

Narcissus 'Boswen.' A.M. April 2, 1946. Raised by the late P. D. Williams, Esq., and sent by Commander A. M. Williams, R.N., Werrington Park, Launceston, Cornwall. A bicolor Trumpet variety. Flowering from March 26 to April 19, 1946. Vigorous with an erect 25-inch stem well above the foliage. Flower 4 inches diameter; perianth 1⅝ inch long, flat, segments overlap for half their length, creamy-white, corona 1¾ inch deep, slightly expanded at the mouth, Sulphur Yellow (H.C.C. 1/3). Flowers 22 in 1945, 40 in 1946 from 25 bulbs.

Narcissus 'Carbineer.' H.C. April 12, 1946. Raised and introduced by Mr. A. M. Wilson and sent by Messrs. Farrow & Son, Holbeach, St. Marks, Spalding, Lincs. An Incomparabilis variety (2a). Flowering from April 4 to 24, 1946. Vigorous with erect 24-inch stems, well above the foliage. Flowers 3¾ inches diameter; perianth segments 1½ inch long, flat, overlapping for two-thirds their length, Sulphur Yellow (H.C.C. 1/1); corona ⅝ inch deep, expanding, Cadmium Orange, base paler (H.C.C. 8/1). Flowers 33 in 1945, 44 in 1946 from 25 bulbs.

Narcissus 'Croceus.' H.C. April 12, 1946. Raised by the late P. D. Williams, Esq., and sent by Major M. P. Williams, Lanarth, St. Keverne, Cornwall. An Incomparabilis variety (2a). Flowering from April 4 to 24, 1946. Vigorous with 19-inch stems. Flowers 4 inches diameter; perianth segments 1⅝ inch long, flat, overlapping for half their length, Canary Yellow (2/1); corona 1¼ inch deep, expanded at mouth, broadly crenate margins, Aureolin (H.C.C. 3). Flowers 25 in 1945, 29 in 1946, from 25 bulbs.

Narcissus ‘Fingal.’ A.M. April 2, 1946. Raised, introduced and sent by Messrs. R. H. Bath, Ltd., The Floral Farms, Wisbech, Cambs. A bicolor Trumpet. Flowering from March 28 to April 18, 1946. Vigorous with 26-inch long stems. Flowers 4¼ inches diameter; perianth segments 1⅞ inch long, flat, overlapping for half their length, creamy-white; corona 1⅞ inch deep, Canary Yellow (H.C.C. 2/2). Flowers 23 in 1945, 38 in 1946 from 25 bulbs.

Narcissus ‘Garron.’ A.M. April 12, 1946. Raised, introduced and sent by Mr. Guy L. Wilson, The Knochan, Broughshane, Co. Antrim. A·trumpet variety (1a). Flowering from April 2 to 24, 1946. Vigorous with stems 21 inches long. Flowers 4⅜ inches diameter; perianth segments 1¾ inch long, flat, overlapping for half their length, Canary Yellow (H.C.C. 2/2); corona 1¾ inch deep, Canary Yellow (H.C.C. 2). Flowers 22 in 1945, 45 in 1946 from 25 bulbs.

Narcissus ‘Glenravel.’ H.C. April 12, 1946. Raised, introduced and sent by Mr. Guy L. Wilson, The Knochan, Broughshane, Co. Antrim. A bicolor Trumpet. Flowering from April 3 to 25, 1946. Vigorous with 19-inch stems. Flowers 3⅝ inches diameter; perianth segments 1½ inch long, flat, overlapping for half their length, creamy-white, corona 1½ inch deep, cream. Flowers 19 in 1945, 50 in 1949.

Narcissus ‘Leslie Hulbert.’ A.M. April 12, 1946. Raised and sent by the Rev. Canon Rollo Meyer, Manor End, Little Gaddesden, Berkhamsted, Herts. A bicolor Incomparabilis. Flowering from April 4 to 26, 1946. Vigorous with 18-inch stems. Flowers 4⅛ inches diameter; perianth segments 1¾ inch long, flat, overlapping for half their length, white; corona expanded at mouth, 1⅛ inch deep, Canary Yellow (H.C.C. 2/2). Flowers 24 in 1945, 40 in 1946 from 25 bulbs.

Narcissus ‘Orange Bird.’ H.C. April 2, 1946. Raised, introduced and sent by Messrs. Barr & Sons, 11–13 King St., Covent Garden, London, W.C. 2. An Incomparabilis variety (2a). Flowering from April 1 to 24, 1946. Vigorous with 24-inch stems. Flowers 4⅛ inches diameter; perianth segments 1¾ inch long, flat, overlapping for half their length, Sulphur Yellow, with a faint creamy-white streak at middle; corona ⅝ inch deep, basin-shaped, Orpiment Orange (H.C.C. at middle 10/2, near lip 10/1). Flowers 37 in 1945, 53 in 1946 from 25 bulbs.

Narcissus ‘Pacific.’ A.M. April 2, 1946. Raised and sent by Messrs. de Graaff-Gerharda, Lisse, Holland. A white Trumpet. Flowering from March 21 to April 14, 1946. Described *R.H.S. Journal*, **61,** 304. Flowers 34 in 1935, 55 in 1946 from 25 bulbs. (**H.C.** 1936.)

Narcissus ‘Rewa.’ A.M. April 2, 1946. Raised by Dr. Lower, introduced and sent by P. Lower, Esq., Presteigne, Manland Avenue, Harpenden, Herts. An Incomparabilis variety (2b). Flowering from April 1 to 17, 1946. Described *R.H.S. Journal*, **61,** 309. Flowers 44 in 1945, 50 in 1946 from 25 bulbs. (**H.C.** 1936.)

Narcissus ‘Rippling Waters.’ A.M. April 12, 1946. Raised, introduced and sent by Messrs. Barr & Sons, 11–13 King Street, Covent

Garden, London, W.C. 2. A Triandrus hybrid (5a). Flowering from April 8 to 26, 1946. Vigorous with a 20-inch stem. Flowers in threes, 3¼ inches diameter, drooping. Perianth 1⅜ inch long, flat, overtheir lapping for one-third length, white; corona cup-shaped, 1 inch deep, white. Flowers 22 in 1945, 42 in 1946 from 25 bulbs.

Narcissus 'Zeeland.' H.C. April 12, 1946. Raised by Messrs. de Graaff-Gerharda, introduced by Messrs. F. Rijnveld & Sons, and sent by Messrs. Farrow & Son, Holbeach St. Marks, Spalding, Lincs. An Incomparabilis variety (2b). Flowering from April 9 to May 1, 1946. Plant vigorous with 18-inch erect stems. Flowers 4¼ inches diameter; perianth segments 1¾ inch long, flat, overlapping for two-thirds their length, creamy-white, pale sulphur at corona; corona basin-shaped, expanded at mouth. Aureolin (H.C.C. 3/1) shading to Saffron Yellow at lip (H.C.C. 7/1). Flowers 23 in 1945, 27 in 1946.

RHODODENDRONS

Rhododendron 'Gladys' (R. campylocarpum × R. Fortunei) var. 'Letty Edwards.' A.M. May 13, 1946. Sent by Messrs. Walter C. Slocock, Ltd., Goldsworth Nursery, Woking, Surrey. Bush of compact, free-flowering habit, with medium-sized flat domed-shaped, 5½ inches diameter, 3½ inches deep, 9–12 flowers per truss. Flowers 2¾ inches diameter, open funnel-shaped, pale Sulphur Yellow (H.C.C. 1/3) shaded a tone darker.

Rhododendron 'J. J. de Vink.' A.M. May 13, 1946. Raised, introduced and sent by Messrs. M. Koster & Sons, Boskoop, Holland. Bush vigorous, very compact and very free flowering. Flower trusses of medium size, pyramidal, flowers closely arranged, 6 inches diameter and 6 inches deep, bearing 11–13 flowers. Flowers 3 inches diameter, funnel-shaped, Rose Red (H.C.C. between 724 and 724/1) blotched brown; filaments and style tinged pink.

Rhododendron 'Peter Koster.' A.M. May 13, 1946. Raised, introduced and sent by Messrs. M. Koster & Sons, Boskoop, Holland. Bush very compact, vigorous and very free flowering with medium-sized flower trusses, pyramidal, 12 to 16 flowered, closely arranged. Flowers 3 inches diameter, open funnel-shaped, Rose Madder (H.C.C. between 23 and 23/1) slightly blotched brown.

Rhododendron 'St. George.' A.M. May 13, 1946. Raised, introduced in 1932 and sent by Messrs. John Waterer, Sons & Crisp, Ltd., Bagshot, Surrey. 'H. M. Arderne' × *R. Griffithianum* hybrid. Bush compact, very free flowering with very large flower trusses, 10–14 flowered, 8 inches deep, dome-shaped. Flowers 4 inches diameter, broad open funnel-shapes, in bud Pale Crimson (H.C.C. 22/1) fading to Pale Crimson (H.C.C. 22/3), distinctly veined Pale Crimson (H.C.C. 22/2).

Rhododendron 'Snow Queen.' A.M. May 13, 1946. Raised by Sir Edmond Loder in 1926, introduced and sent by the Knap Hill Nursery, Ltd., Woking, Surrey. *R. halopeanum* × *R. Loderi*. Bush compact, very free flowering, with dome-shaped trusses, 6 inches diameter, 9–10 flowered. Flowers 3 inches diameter, funnel shaped, buds Neyron Rose (H.C.C. 623/1) passing when fully open to pure white with a very slight red blotch at base.

SWEET PEAS

These Awards were recommended by the Joint Sweet Pea Committee of the R.H.S. and National Sweet Pea Society after trial at the University of Reading's Experimental Station at Shinfield.

Sweet Pea 'Clare Boothe Luce.' A.M. July 20, 1946. Raised and sent for trial by Messrs. W. Atlee Burpee Co., Philadelphia, Pennsylvania, U.S.A. Flowers large, in fours, a shade of Fuchsine Pink (H.C.C. between 627/1 and 627/2).

Sweet Pea 'Cynthia Davis.' F.C.C. July 20, 1946. Raised and sent for trial by Messrs. R. Bolton & Son, Birdbrook, near Halstead, Essex. Flowers large, in fours, a clear rich shade of salmon-cerise.

Sweet Pea 'Fairy Princess.' A.M. July 20, 1946. Raised and sent for trial by Messrs. Carters Tested Seeds, Ltd., Raynes Park, London, S.W. 20. Flowers large, in fours, standards Camellia Rose (H.C.C. between 622/1 and 622) on a creamy-white ground, wings Camellia Rose (H.C.C. between 622/1 and 622/2).

Sweet Pea 'Fire King.' A.M. Raised and sent for trial by Messrs. R. Bolton & Son, Birdbrook, near Halstead, Essex. Flowers large, in fours, a shade of Cherry Red (H.C.C. between 722/1 and 722/2).

Sweet Pea 'Gaiety.' F.C.C. July 20, 1946. Raised and sent for trial by Messrs. R. Bolton & Son, Birdbrook, near Halstead, Essex. Flowers large, in fours, a bicolor, standards Mallow Purple (H.C.C. between 630 and 630/1), paler towards the base, wings Mallow Purple (H.C.C. 630/3).

Sweet Pea 'Ida.' A.M. July 20, 1946. Raised and sent for trial by Mr. G. P. Edwards, Old Hall Farm, Overton Bridge, Wrexham. Flowers large, in fours, cerise rose-pink.

Sweet Pea 'Mabel Gower.' A.M. July 20, 1946. Raised and sent for trial by Messrs. R. Bolton & Son, Birdbrook, near Halstead. Essex. Flowers large, in fours, near Wistaria Blue (H.C.C. 640/1) with darker shading on the standards.

Sweet Pea 'Pink Beauty.' A.M. July 20, 1946. Raised and sent for trial by Messrs. R. Bolton & Son, Birdbrook, near Halstead, Essex. Flowers large, in fours, Carmine (H.C.C. 21/1), paler towards the base of the standards, on a white ground.

Sweet Pea 'Scarlet O'Hara.' A.M. July 20, 1946. Raised and sent for trial by Messrs. Carters Tested Seeds, Ltd., Raynes Park, London, S.W. 20. Flowers large, in fours, Blood Red (H.C.C. 820/3) ; does not fade.

BOOK NOTES

"Fruit Bud Development." Bulletin No. 137. Ministry of Agriculture. (H.M.S.O.) 2s.

This Bulletin contains a brief introduction on spraying of fruit, together with a series of pictures in colour showing the stages of fruit bud development for Apples, Pears, Plums, Cherries, Black Currants, Gooseberries and Raspberries. It should be used in conjunction with the Spraying Calendar which was published in the JOURNAL (October, 1946), and which has also been reprinted. Together, these two publications provide a complete spraying guide.

"Fruit Fall and its Control by Synthetic Growth Substances." By M. C. Vyvyan, D.Sc. (Published by Imperial Bureau of Horticulture, East Malling, and obtainable from Imperial Agricultural Bureau, Central Sales Branch, Penglais, Aberystwyth.) 3s. *6d.*

Experiments both in America and East Malling have shown that significant control can be obtained on some varieties of Apples and Pears by spraying with certain synthetic growth substances, such as napthaleneacetic acid in a concentration of ten parts per million. This appears to be a technique for the larger grower at present who is prevented by weather or other factors from harvesting his crop at the correct time. The results so far are very amply summarized in this paper.

"Merrilleana, a Selection from the General Writings of Elmer Drew Merrill." (Chronica Botanica Co., Waltham, Mass., U.S.A.; Wm. Dawson & Sons, London, W.C. 1.) Chronica Botanica, Vol. 10, No. 314, pp. 127–394. Illus. 1946. $4.

In October, 1946, Professor E. D. Merrill, late Administrator of the Botanical Collections of Harvard University, celebrated his seventieth birthday. To mark the occasion, the Chronica Botanica Co. has published this selection from his numerous contributions to botanical literature and thus made conveniently available various papers of general interest which otherwise would have lain buried in a great number of scientific periodicals. They begin with an account, first published in 1907, of the ascent of Mount Halcon, in the Philippines, and conclude with an essay, published in 1946, on tobacco in New Guinea. Since Merrill was from 1902 to 1924 engaged on botanical work in the Philippines, it is a tribute to his wide range of interests that only eight of the twenty-three papers here reprinted deal primarily with the botany of the Philippines, Malayasia and Polynesia. The others relate to leprosy (1929), Palisot de Beauvois (1936), Loureiro (1935), the Atlantis myth (1936), herbarium technique (1937), Rafinesque (1943), economic aspects of plant taxonomy (1943), Sir David Prain (1944), William Bartram (1945), etc. Strictly technical papers describing new species, revising genera, recording distribution and establishing the identity of plants described by Houttuyn, Blanco, Loureiro, Rumphius and Burman are not included, although they bulk very large in the 480-item bibliography of the Professor's writings on pp. 144–157. The papers republished here emphasize the biographical and phytogeographic aspects of botany. The most generally interesting are those on domesticated plants in relation to the diffusion of culture. With regard to supposed ancient pre-Columbian contacts between the peoples of the Old and New Worlds involving architecture, sculpture, etc., Merrill notes that "before 1492 there was not a single basic cultivated food plant and not a single domesticated animal except the dog common to the two hemispheres." This simple fact, with all its implications, scuttles the Atlantis myth.

These essays represent only a small part of Professor Merrill's literary output, and that in turn has been only part of a varied and highly successful administrative career, during which he has been Director of the Bureau of Science, Manila, Dean of the College of Agriculture, University of California, Director of the New York Botanical Garden, Arnold Professor of Botany, Harvard University and Director of the Arnold Arboretum. He was made an Honorary Member of the Royal Horticultural Society in 1935. All those acquainted with the good work he has done in so many fields of botanical and horticultural activity will wish him a long and happy period of further activity now that his recent retirement has freed him of official duties.

W. T. STEARN.

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JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

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July 1947

THE SECRETARY'S PAGE

Programme of Meetings.—During July and August there will be Meetings and Shows as follows :—

Tuesday, July 1—12 noon to 6 P.M.
Wednesday, July 2—10 A.M. to 5 P.M.
Tuesday, July 15—12 noon to 6 P.M.
Wednesday, July 16—10 A.M. to 5 P.M.
Tuesday, July 29—12 noon to 6 P.M.
Wednesday, July 30—10 A.M. to 5 P.M.
Tuesday, August 12—12 noon to 6 P.M.
Wednesday, August 13—10 A.M. to 5 P.M.

In connection with the Show on July 15 there will be a Fruit and Vegetable Competition for Amateurs and a Competition for the Clay Cup, which is offered annually for the best new, scented Rose. At the Show on July 29 there will be a Hardy Flower Competition for Amateurs. A feature of the Show in August will be the Foremarke Cup Competition for Gladioli. Schedules for all these competitions can be obtained on application to the Secretary, The Royal Horticultural Society, Vincent Square, S.W. 1.

Lectures.—During July the following lectures will be given, each one taking place at 3 P.M. in the Lecture Room of the Society's New Hall, Greycoat Street :—

On July 1.—" Nomocharis," by Mr. D. Wilkie.

On July 15.—The second Masters Memorial Lecture on " Plant Hormones and their Relation to Horticulture," by Dr. T. Swarbrick.

On July 29.—" The Cold Cultivation of Fuchsias," by Mr. W. P. Wood.

Carnation Show.—The National Carnation and Picotee Society will be holding a Show in the Old Hall on Tuesday and Wednesday, July 15 and 16, to which our Fellows' and Associates' tickets will admit.

"Evening News" Flower and Vegetable Show.—*The Evening News* is holding a Flower and Vegetable Show in the Society's Halls on Friday and Saturday, July 4 and 5. The Society's tickets will not admit to this Show, but admission may be obtained on payment at the door. The charge will be 1*s.* 9*d.*

Demonstrations at Wisley.—The following demonstrations will be given at the Society's Gardens at Wisley during July and August, the second demonstration in each case being a repetition of that on the first day :—

Fruit Garden

Wednesday and Thursday, July 9 and 10.—Summer Pruning of Fruit Trees (2–4 P.M.).

Flower Garden

Wednesday and Thursday, August 6 and 7.—Vegetative Propagation of Shrubs and Herbaceous Plants (2–4 P.M.).

Subscriptions.—Fellows who have friends who are thinking of joining the Society are reminded that, as half the year has passed, anyone elected after the end of June is required to pay only half a year's subscription in respect of the remainder of the current year. It is, therefore, advantageous to join the Society in July. The Secretary will be pleased to send a form of application for Fellowship on receipt of a postcard.

Publications.—The Rhododendron Handbook is now available, price 15*s.* 0*d.*, postage 6*d.* This contains the list of species with descriptions together with list of hybrids, formerly published in the Rhododendron Association's Year Book. It has been completely revised and it is proposed to revise and republish this handbook every five years.

Colorado Beetle.—The Ministry of Agriculture and Fisheries asks that notice may be drawn to the danger of the Colorado Beetle establishing itself in this country. The beetle was found in twenty-five separate places in this country in 1946, and in view of the likelihood of further outbreaks in 1947 the need for vigilance is greater than ever since it is of the utmost importance that any outbreaks should be dealt with by the Ministry before the pest has time to spread or multiply. The Ministry is accordingly anxious to obtain as early notification as possible of the discovery of the pest in this country.

Any yellowish beetle with black stripes running up and down the beetle, not across, or any red or reddish-yellow grub that is found feeding upon potato leaves should be regarded with suspicion.

When grubs or beetles suspected of being Colorado Beetles are discovered, specimens should be placed in a tin box (in which no holes should be punched) with a piece of potato leaf and the box should be sent to the Ministry of Agriculture, Plant Pathology Laboratory, 28, Milton Road, Harpenden, Herts., with a letter stating the exact place where the insects were caught and the name and address of the finder. Nothing more should be done until instructions are received from the Ministry.

WISLEY IN JULY

THIS month will see the centres of interest in the gardens moving from the waning display of the flowering trees and shrubs, to the increasing numbers of annuals and perennials now coming into flower, both in the borders and on the trial grounds, while the vegetable trials in Wisley village and the experimental plots near the model fruit gardens at the top of the Rose borders are additional points of interest.

The main displays will be found on the Floral Trial Grounds, the Annual Border, Rock Garden and Alpine House, the Wild Garden and the Herbaceous Borders. On entering the Gardens visitors will note that every effort is being made to refurnish the collection of slightly tender plants round the Laboratory, following the losses of the past winter. Amongst the established plants flowering this month the single yellow or cream Rose ' Mermaid ' is always pleasing, while one of the recently planted subjects carrying a few flowers is *Abutilon megapotamicum* whose red and yellow blossoms are produced over a long period. When establishing wall plants of doubtful hardiness it is always advisable to plant strong pot-grown specimens during the late spring and to give every encouragement to secure a large and well-established plant before the winter. Stocks of these subjects should always be kept on hand, particularly where the established specimens are of a fair age, as there appears to be definite grounds for believing that lack of vigour and old age increase the plant's susceptibility to severe winter frost damage.

The Rose beds near the Laboratory will be in full flower. Beyond them the Delphinium collection will be slowly passing over during the later part of the month, but many trials of annuals from spring-sown seed will be opening their first flowers now, and the trial of Pinks and Border Carnations will also be in bloom on the trial grounds.

Passing along the Rose Walk towards the Alpine House we shall be able to note not only the dwarf polyantha and other Roses, but the interesting collection of climbers trained on posts at the back of the border. Turning towards the Alpine House we pass the top of the annual border, which will well repay closer study. A good collection, containing many of the lesser known annuals, was sown direct into the border during April and early May, and now after careful thinning of the seedlings the border is coming into flower, and will provide a wealth of bloom until the frost intervenes. For the wealth and variety of bloom and the small amount of labour required to produce it this must be one of the easiest ways of forming a colourful summer border.

The Alpine House will still have many interesting things to show, with several fresh Campanulas to carry on the display including × *Campanula Tymonsii* and × *C. haylodgensis*, both with pale blue flowers on rather trailing stems, and the more erect *C. lasiocarpa*. Other unusual plants include the shade loving *Conandron ramondioides*, *Theropogon pallidus* with grassy foliage and pink Lily-of-the-Valley-like flowers, and *Verbascum spinosum*, a small thorny shrub, in contrast with the more usual herbaceous members of the genus.

The Rock Garden is still well clothed with flowers, but it is not possible to note more than a few of the many good plants. The very reliable Gentians *G. lagodechiana* and *G. septemfida* will be in bloom with many Campanulas, *Codonopsis clematidea* and *C. ovata*, with the brilliant blue of *Cyananthus lobatus* and *C. Sherriffii*. Several self-sown plants of *Orchis maculata* forms will be flowering during the early part of the month, while in the bog garden at the foot of the slope will be found good clumps of *Orchis foliosa*.

The Wild Garden contains an interesting collection of Lilies, increased by additional plantings earlier this year, particularly a planting of *Lilium giganteum* in all bulb-sizes to ensure a display of this giant every year, as the bulbs divide after flowering and take two to three years before they again produce a spike. The orange and red *Lilium pardalinum* increases fairly rapidly here without close attention while the clump of *L. rubellum*, if they do not increase, maintain their size and flower every year. Many of the other species, however, require replanting from time to time, but most are easily raised from seed and restocking presents no difficulty if regular seed sowing is practised.

The last of the Primulas, particularly the moisture loving *P. Florindae*, will also be in flower here, with several of our most valued late flowering shrubs, including *Eucryphia glutinosa* and the hybrid *E.* × *nymansensis* which suffered from the severe winter weather. *Magnolia virginiana* will be in flower and *Rhododendron auriculatum* should open its large and fragrant white flowers during this month.

The Heath Garden will have many fresh subjects in flower, particularly the many varieties of our native *E. cinerea* such as *rosea*, *coccinea* and 'Domino' a striking white with black calyx and flower stems, also *E. ciliaris*, the 'Dorset Heath' and *E.* 'Dawn,' a hybrid between this and *E. tetralix*, the cross-leaved Heath, followed later in the month by the great selection of the many forms of *Calluna vulgaris*. Other shrubs in Seven Acres include the late-flowering Spiraeas, particularly *Spiraea* 'bumalda' and 'Anthony Waterer' with many Philadelphus and Deutzias, while the trees of *Catalpa bignonioides* with large Horse-chestnut-like inflorescences are very outstanding. The ponds will be filled by the foliage and flowers of the many Water Lilies, while *Butomus umbellatus*, the Flowering Rush, and *Pontederia cordata*, the blue Pickerel Weed, blossom on the margins.

Returning through the herbaceous borders, where many bold groups of tall flowers are massed, we shall be able to note only the most outstanding subjects, and admire the careful planning necessary to ensure a continuous display without unsightly gaps in this most prized feature of the gardens. In addition to the many varieties of Delphiniums, Heleniums, and Phlox, good whites will be found in *Polygonum paniculatum*, *Clematis recta* and *Cimicifuga racemosa*, while yellow is provided by the flat heads of *Achillea Eupatorium* and orange by the brilliant daisies of *Anthemis Sancti-Johannis*. Other interesting plants include Alstroemeria 'Dover Orange,' Anchusa 'Morning Glory' and *Verbascum paniculatum*.

Near the Greenhouses will be found the collection of Fuchsias shown at Chelsea which are now accommodated in two large beds behind the collection of Penstemons. The greenhouses, particularly the Temperate House, will have many plants to show in flower, some of the most striking being *Solanum Wendlandii* trained on a pillar on the east side of the house, *Lonicera Hildebrandtiana*, also trained as a climber, *Plumbago capensis* producing a wealth of pale blue blossoms until late in the year, and the well known ' Oleander ' in both its single and double forms.

For visitors who can make a fuller inspection the vegetable trials in Wisley village will prove extremely instructive, but they are open only during normal working hours, as it is not possible to provide an attendant at other times. A large trial of spring-sown Cauliflowers should be reaching maturity early this month and main crop Peas are also on trial, These, together with the many samples of seed being grown for the Seed Import Board, will well repay a visit by those interested in vegetable growing.

THE HISTORY OF ANEMONE JAPONICA

By E. A. Bowles & W. T. Stearn

PART I

FOR the decoration of the garden in Autumn few if any herbaceous perennials are more free-flowering and more handsome than the pink and white Anemones usually regarded as forms of *Anemone japonica*, under which name they received in 1929 the R.H.S. Award of Garden Merit. This award was established in 1922 to mark plants of proved and outstanding excellence for garden use, and well these " Japanese Anemones " deserve it. A study of their history and characteristics, which was begun more than fifteen years ago but which was carried on only intermittently during the war years, has brought to light a number of interesting facts which seem to deserve record and publicity. It may be as well to state at the outset that most of the plants grown under the name *Anemone japonica* have no right to that title. This conclusion has already been published by a Swedish botanist, Dr. NILS HYLANDER of Uppsala, in *Svensk Botanisk Tidskrift*, **39**, 49–64 (1945), and it is a pleasure to have arrived, by independent survey of a greater range of herbarium material and horticultural literature than was available to him, at results which are essentially the same as his.

The " Japanese Anemones " which ornament our gardens in Autumn are not natives of Japan, but are mostly hybrids of European origin derived in part from a Chinese species. The first form of this to be introduced into European gardens was a semi-double one, with numerous (more than 20) narrow perianth-segments (tepals). It is cultivated by the Chinese in Kiangsu and Yunnan provinces and, like many other Chinese garden plants, was introduced long ago into Japan where it first came to the notice of European naturalists. Hence the involved synonymy of the species relates primarily to this cultivated semi-double form, the historic *A. japonica* (Fig. 112), and only incidentally to the normal single-flowered stock, *A. hupehensis* (Fig. 113), with usually five almost orbicular rather broad perianth-segments, which is undoubtedly wild in China but not in Japan.

The explanation of this paradoxical state of affairs is to be found in the history of European relations with China and Japan in the eighteenth century and the first half of the nineteenth century. During this period no plant-collecting foreigners were allowed to roam at will in either country. European botanists and gardeners had to be content with such plants as grew wild near Canton, Macao, Peking and Nagasaki or were cultivated at these places. Those which came to their notice accordingly included many of garden origin. The floristically rich mountainous interior of China, being difficult of access and screened by intensively cultivated and botanically rather dull coastal provinces, remained untapped almost to the present century. The wild flora of Japan became available to Western gardens long before that of China. Nevertheless from 1638 to 1856 Japan was a closed country and knowledge of its plants was acquired only gradually and with great difficulty by a few enthusiastic doctors in Dutch employ at Nagasaki, then the one trading port of Japan.

During this period the Tokugawa Shoguns, alarmed by Spanish aggression in America and the Pacific, sought to protect Japan by isolating it from the rest of the world, forbidding Europeans to enter the country and the Japanese to leave it. The Dutch East India Company was alone permitted to maintain a trading post on a little island called Deshima or Dezima, in Nagasaki harbour, Kyushu, southern Japan. Here the Dutch lived like prisoners. Their medical men and naturalists, notably CLEYER, KAEMPFER, THUNBERG and SIEBOLD, made the most of their limited opportunities for study, but inevitably they derived their notions of the Japanese flora largely from plants cultivated at Nagasaki. They knew nothing of the extent to which Japanese gardens had been enriched by importations from China, for they knew even less about China than they did about Japan. Consequently they named many a species "*japonica*" which was "only Japanese by cultivation and really Chinese in origin," as E. H. WILSON has made clear, and often they based their descriptions on abnormal garden forms differing considerably from the nearest related wild plants and thus by no means typical of the species as a whole. The history of *Anemone japonica* well illustrates this.

ANDREAS CLEYER, a German doctor in Dutch employ, was the first to record the semi-double Anemone later named *Anemone japonica* (Thunb.). He lived at Nagasaki from 1682 to 1686 and stated in 1695 that the Japanese called this "kind of field buttercup" with peach-coloured flowers the "Tzooschin kiku" and grew it for ornament in their gardens at Nagasaki. The crude figure which accompanies his note in *Misc. Curiosa Ephem. Acad. Caesareo-Leopold.*

III Ann. **2,** 285 (1695) is best described as a caricature drawn with little regard for accuracy, though it indicates the plant's general habit of growth, its branched many-flowered involucellate inflorescence and its numerous narrow perianth-segments. A Swedish doctor and naturalist, Carl Peter Thunberg (1743–1828), likewise employed by the Dutch East India Company at Nagasaki, was the first to give it a scientific name. He described it in 1784 as *Atragene japonica.* Failing to suspect that it was not a typical wild form, but a monstrosity with an abnormally increased number of outer floral segments, Thunberg stated that the numerous sepals necessitated its inclusion in Atragene although it resembled an Anemone in general appearance. Not until 1835, when Philipp Franz von Siebold and Joseph Gerhard Zuccarini published the first part of their *Flora Japonica* (p. 15, t. 5), was the plant placed for the first time in its correct genus and described and figured as *Anemone japonica* (Thunb.) Sieb. et Zucc. Unfortunately this combination of names is untenable because a blundering Dutch botanist Martinus Houttuyn (1720–98) had as early as 1778 named *Anemone japonica* Houtt. a plant which his figure shows clearly to be *Clematis florida* Thunb. as Merrill has pointed out. *Anemone japonica* Houtt. is a synonym for all time of *Clematis florida,* but under Article 61 of the *International Rules of Botanical Nomenclature,* 3rd ed. (1935) a new name has to replace the later homonym *Anemone japonica* (Thunb.) Sieb. et Zucc. non Houtt. Merrill in 1938 (*Journ. Arnold Arb.* **19,** 339) accordingly renamed this *A. nipponica* Merr., being evidently unaware of the name *A. hupehensis* already in use for a conspecific form.

The name *Anemone hupehensis* was applied originally to a plant of Chinese origin offered to the public in the autumn of 1908 by the well known French nursery V. Lemoine et Fils of Nancy as *A. japonica hupehensis.* The descriptive note in their *Catalogue* **170,** 42 (Automne 1908) may be translated as follows: " The great interest of this variety lies in its origin. As its name indicates, it grows in a wild state in the province of Hupeh (Central China). The foliage is very similar to that of *A. japonica* type [i.e. the red semi-double *A. japonica* (Thunb.) Sieb. et Zucc. non Houtt.]. The many-flowered inflorescences are rather short. The flowers, of medium size, consist of five well-rounded sepals, of a mauve colour, more or less carmine at their insertions and at their edges." * In 1909 (*Cat.* **172,** 50) they again catalogued the plant as *A. japonica hupehensis.* In 1910, however, in their *Catalogue* **176,** 40 (Automne 1910), the Lemoines treated it as a species distinct from *A. japonica* and named it *A. hupehensis,* describing it as " from the province of Hupeh (Central China) and close to *A. japonica*; flowers with five sepals, of a mauve more or less carmine at their insertion; flowering very early." * The name *A. hupehensis* was taken up by a number of horticultural writers, e.g. Bowles, *My Garden in Autumn*, 113 (1915); Silva Tarouca and Schneider, *Unsere Freiland-Stauden*, 3rd ed. 104 (1922) 4th ed. 100, (1927), 5th ed. 61 (1934); Bergmans, *Vaste Planten*, 59 (1924), but seems not to have been used in any botanical publication until 1931, when Boynton published a coloured illustration (Fig. 113) in *Addisonia* **16**, 33, t. 529, together with a short description. Whether it be cited from Lemoine's *Catalogue* of 1910 or Boynton's article of 1931, the name *A. hupehensis* clearly antedates *A. nipponica* which was not published until 1938.

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* " *Anemone japonica hupehensis.* Prix : la pièce, 2 fr. ; 3 plantes, 4 fr. 50. Le grand intérêt de cette variété réside dans son origine. Comme son nom l'indique, elle croît à l'état sauvage dans la province de Hou-Pé (Chine centrale) ; son feuillage est assez voisin de celui de *l'Anemone japonica* type. Ses inflorescences, multiflores, sont peu élevées. Ses fleurs, de taille moyenne, comptent cinq sépales bien ronds, d'un mauve plus du moins carminé à leur insertion et sur leurs bords. Floraison en août, septembre et octobre " (V. Lemoine et Fils, Catalogue et Prix-Courant 1908–1909, p. 42 : 1908).

Messrs. Lemoine did not receive *A. hupehensis* direct from China, but purchased their stock in April 1908, as they themselves have courteously informed us, from Messrs. Willy Müller of Nocera Inferiore, near Naples. This firm, of which Carl Sprenger was long the head, put on to the market a number of Chinese plants raised from seed, cuttings and tubers sent to Sprenger from 1902 onwards by an Italian missionery, Cipriano Silvestri, who botanized in Hupeh between 1900 and 1910. Sprenger's articles on new and rare Chinese shrubs and trees in *Mitth. Deutsch. Dendrol. Ges.* **16,** 66 (1807), **19,** 243 (1910), **20,** 237, 240 (1911) naturally do not acknowledge the receipt of any Anemone but indicate the great variety of plants introduced by Silvestri. He undoubtedly collected herbarium specimens of this plant; Pampanini in *Nuovo Giorn. Bot. Ital.* (n.s.) **17,** 268 (1910) referred them to *A. japonica*. It most unlikely that Silvestri would have failed to include so conspicuous a species as *A. hupehensis* in his sendings to Sprenger and, as its introduction from Hupeh coincides with the period of his activity there, he must surely be credited with making available to European and American gardens this handsome and graceful plant. It is perfectly hardy and easy to cultivate.

Anemone hupehensis (Fig. 113) has long-stalked, trifoliolate basal leaves, with distinctly stalked, sub-cordate, shallowly 3–5 lobed, serrate acuminate leaflets, the middle one narrowly ovate, the lateral ones asymmetric which are sparsely pilose above and below, the hairs not completely covering the surface as they do in *A. tomentosa*. The flower-stem may rise to a height of 3 feet, but is usually between 1 and 2 feet high, and branches above the two- or three-leaved involucre, carrying up to 15 or so flowers of good substance and pleasing rounded form about 2½ to 3 inches (6–8 cm.) across under cultivation but smaller (about 4 cm. across) in wild Hupeh specimens collected by Silvestri and others. The long-pedicelled flowers have five outspread, almost orbicular perianth-segments (tepals) up to 1⅝ inches (4 cm.) long, 1⅛ inches (3 cm.) broad under cultivation, rose-pink in

* "*Anemone hupehensis* Prix : 1 fr. 25. Originaire de la province de Hou-Pé (Chine centrale) et voisine de l'*A. japonica*; fleurs à 5 sépales d'un mauve plus ou moins carminé à leur insertion; floraison tres hâtive (V. Lemoine et Fils, Cat. 1910–1911, p. 40: 1910).

colour, silky outside. The anthers are yellow. The pollen grains of a plant grown at Myddelton House and representing the original introduction were found to be 95 per cent. fertile by Dr. E. K. JANAKI AMMAL.

The clone in cultivation under the name *A. hupehensis* matches herbarium specimens collected in China and enumerated by FORBES and HEMSLEY (1886), DIELS (1900), ULBRICH (1905) and PAMPANINI (1910) as *A. japonica.* The name *A. hupehensis* can accordingly be adopted for this wild Chinese species, as HYLANDER has already indicated in his "Notes on *Anemone nipponica* Merr. and allied forms" in *Svensk Botanisk Tidskrift*, **39,** 49–64 (1945). The herbarium material at Kew and Edinburgh proves that *A. hupehensis* is indubitably widespread in central and western China, occurring in Hupeh, Hunan, Szechwan, Kweichow, Kwangsi and Yunnan, and probably also in Formosa and North Luzon, Philippines, for the trifolioliate species of these islands, enumerated by HAYATA in *Bot. Mag. Tokyo*, **20,** 73 (1906) as *A. luzoniensis* and by MERRILL and ROLFE in *Philipp. Journ. Sci. Bot.*, **3,** 99 (1908) as *A. vitifolia*, does not appear separable, at any rate in a dried state, from that of central China. *A. hupehensis* is of more southern distribution than its close ally, *A. tomentosa* (Maxim.) P'ei (1933), from which it differs principally in its leaves being pilose but not tomentose beneath. *A. tomentosa* (*A. vitifolia* var. *tomentosa*) was introduced into cultivation by PURDOM in 1909 and by REGINALD FARRER in 1914. It is a robust grower, sometimes up to 5 feet high under cultivation, and, although pink-flowered and perfectly hardy, is usually known in gardens as "*A. vitifolia.*" *A. hupehensis* further differs from *A. tomentosa* in being of lower growth, with narrower leaflets and deeper coloured perianth-segments, and it begins to flower and finishes flowering several weeks later than *A. tomentosa.* Vegetatively, however, *A. hupehensis* agrees closely with the semi-double *A. japonica* (Thunb.) Sieb. et Zucc. Indeed, except in the number and shape of their perianth-segments, the two are essentially the same. A marked increase in the number of segments is, in the genus Anemone, almost always associated with a reduction in their width but not necessarily in their length. To our thinking *A. japonica* (Thunb.) is no more than a semi-double form of *A. hupehensis*, but as, apparently through man's agency, it has attained a distribution of its own and is a constant and easily recognized entity, it may be distinguished as *A. hupehensis* var. *japonica.** HYLANDER, however, by "interpreting as species the morphologically clearly separable and geographically separated extreme types" within this group of Anemones, ranks *A. japonica* (Thunb.) under the name *A. nipponica* as a species equivalent in standing to *A. vitifolia* and *A. tomentosa* and concludes that "for the types intermediate between *nipponica* and *tomentosa* and probably ranking as hybrids between these species the name *A. hupehensis* should be used." He was led to this conclusion by the fact that the pollen in the plant cultivated at Alnarp, Sweden, as *A. hupehensis* was mostly sterile ("extremely poor"), as also in the horticultural variants *A. hupehensis splendens* and *A. hupehensis praecox*, whereas the pollen in *A. japonica* (Thunb.), *A. vitifolia* and *A. tomentosa* was more or less perfect (about 90 per cent. fertile). However the pollen in the two cultivated 5-tepalled *A. hupehensis* forms examined for us by Dr. JANAKI AMMAL ranged from 84 per cent. fertile in an unnamed variant to 95 per cent. fertile in the type. Hence HYLANDER'S view seems untenable; the evidence, in our opinion, points to the single-flowered *A. hupehensis* being a species widespread in China and var. *japonica* an unusual form derived from it.

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* **Anemone hupehensis** Lemoine var. **japonica** (Thunb.) Bowles et Stearn, comb; nova. *Syn. Atragene japonica* Thunberg, Fl. Jap 239 (1784)—*Clematis polypetala* Poiret, Encycl. Bot. Suppl. 2, 296 (1811)—*Anemone japonica* (Thunb) Siebold et Zuccarini, Fl. Jap. **1,** 15, t. 5 (1835), Lindley in Bot. Reg. **31,** t. 66 (1845). Hooker in Bot. Mag. **73,** t. 4341 (1847); Fortune, Three Years' Wanderings 330, 406 (1847); Iinuma, Somoku Dzusetsu Sufu, 3rd ed. **10.** t. 40 1910); non *A. japonica* Houttuyn, Nat. Hist. II .**9.** 191, t. 55 (1778) —*A. vitifolia* var. *japonica* (Thunb.) Finet et Gagnepain in Bull. Soc. Bot. France, **51.** 68 (1904)—? *A Scabiosa* Léveillé et Vaniot in Bull. Acad. Géogr. Bot. (3) **11.** 47 (1902), lusus teratologicus valde abnormalis; cf. Int. Rules Bot Nom. 3rd ed. Art. 65 (1935)—*A. hybrida* var. *japonica* (Thunb.) Ohwi in Acta Phytotax. **7.** 46 (1938)—*A. nipponica* Merrill in Journ. Arnold Arb. **19.** 339 (1938); Hylander in Svensk Bot. Tidskr. **39.** 50, fig. 1 (1945).

Before the introduction of the five-tepalled Hupeh Anemone about 1905, this semi-double variety *japonica* was the only "Japanese Anemone" obtained for European gardens by direct importation from Eastern Asia and it was introduced, not from Japan, but from China in 1844 by the Horticultural Society's collector, ROBERT FORTUNE (1812–80). Although CLEYER, THUNBERG and SIEBOLD knew the plant well in Japanese gardens at Nagasaki, they appear to have sent back to Europe only drawings and dried specimens. They did not suspect it of being Chinese in origin and regarded it as a native of Japan. Thus SIEBOLD and ZUCCARINI described it in 1835 as being found "in moist woods, along the banks of streams, etc., most frequently on mount *Kifune* near the capital *Miako*, whence the Japanese name *Kifune-gik* meaning *Aster of Kifune*." In view, however, of the severe restrictions imposed upon foreigners in Japan down to 1856, this account of the plant's predilection for damp forests etc. was probably based on hearsay, not on direct personal observation; although Dutch embassies to the Shogun passed through Miyako (now Kyoto) in their way to Yedo (now Tokyo) it is unlikely that SIEBOLD would have been allowed to botanize freely in the wild. Kibune is in Kyoto (or Yamashiro) region. The Japanese word "kiku" (in compounds "giku") means "Chrysanthemum" and indicates a many-rayed flower. The vernacular name "Kibune-giku" (romanized by SAVATIER as "Kibune guicou") occurs in the *Ka-i* (or *Kwa-wi*) **3**, fol. 19 (dated 1765) of YONAN, whose excellent woodcut is reproduced in Fig. 112. It does not necessarily mean that the plant is native to Kibune, although YONAN'S text, copied from an earlier Japanese work, states that "it grows abundantly in valleys" without specifying any one place (cf. SAVATIER, *Livres Kwa-wi*, 47: 1873). However, authors have regarded SIEBOLD'S statement as an authentic record of the native habitat of *Anemone japonica* (Thunb.), despite his significant remark that it was frequently cultivated in gardens for its beautiful purplish flowers and was almost always propagated vegetatively because seeds rarely matured.

Japanese illustrations indicate that this semi-double form is the only one found in Japan. Until recently the pink and white-flowered " Japanese Anemones " of European gardens were quite unknown there. Thus the three celebrated Japanese iconographies of plants, the 1765 *Ka-i* (or *Kwa-wi*), **3,** fol. 19 of Mitsufusa Shimada, alias Yonan Si, the 1828 *Honzo Zufu* (or *Phonzo Zoufou*), **15,** fol. 16 of Tsunemasa Iwasaki and the 1856 *Somoku-Dzusetsu* (or *So mokou Zoussetu*), **10,** fol. 40 of Yokusai Iinuma, all figure only this purplish-red semi-double form with twenty or more perianth segments. No Japanese work illustrates a single-flowered " Japanese Anemone. ' All the herbarium specimens from Japan at Kew, Edinburgh, and the British Museum (Natural History) belong to the semi-double form. Confirmation of this opinion was kindly supplied in 1940 by the Japanese systematist Dr. Hiroshi Hara, who wrote, " only a double-flowered form of *Anemone japonica* S. et Z. is known in a wild condition in Japan and no fruit has ever been observed, although it occurs widely in low mountain districts in middle and western Honshu, Shikoku and Kyushu." It seems evident that in Japan this Anemone is an introduced plant which has become naturalized.

The occurrence in China of *A. hupehensis* var. *japonica* was first made known by Robert Fortune who came across it in 1843, " in full flower amongst the graves of the natives, which are round the ramparts of Shanghae," noting that " it blooms in November, when other flowers have gone by, and is a most appropriate ornament to the last resting-places of the dead," for " flowers which the Chinese plant on or among tombs are simple and beautiful in their kind " and " no expensive camellias, moutans, or other of the finer ornaments of the garden are chosen for this purpose." A plant of such character may, for its funereal associations, be taken far from its original home and planted in wild remote places used by the superstitious for the burial of their dead, there to persist indefinitely and possibly to become so thoroughly naturalized as to appear indigenous. A parallel instance is supplied by the white *Iris albicans*, which Moslems plant on their burial grounds as a symbol of mourning. This albino form of a blue-flowered Arabian species they have carried eastward to Kashmir and westward to Spain where, its Moorish association forgotten, it was first described as a native Spanish plant. Here again, as with *Anemone japonica*, an abnormal form became known many years earlier than the normal wild population from which it had been derive. The semi-double red Anemone, like the sepulcral Iris, is a long-lived and vigorous herbaceous perennial, able to survive and even to spread vegetatively when once established, and human agency has probably likewise brought about its curious sporadic distribution.

Fortune introduced *Anemone japonica* into European gardens from Shanghai, Kaingsu province, Swinhoe collected it at Fuchow, Fukien province, and Hu at Lung Cheun Hsien, Chekiang province. These localities are in the coastal provinces, but many specimens come from the far western province of Yunnan, where Forrest collected it on several occasions. His specimen 6934, gathered at 6,500–7,000 feet on the eastern flank of the Tali range (lat. 25° 40′ N.), is described by him as being a "plant of 18 to 30 inches; flowers magenta-rose; open situations on margins of thickets" and well matches specimens from Japan. Another FORREST specimen with semi-double, many-tepalled flowers, under No. 4361, is labelled "plant of 1½ to 2 feet; perianth interior purplish rose, exterior silvery; dry rocky pasture land at the base of the eastern flank of the Tali range; lat. 25° 40′ N.; alt. 6,700–8,000 feet." Lord ABERCONWAY'S Chinese collectors have found it in western Yunnan, locality not specified. C. K. SCHNEIDER likewise collected it near Tali and also near Sungyueh and Chungtien under his numbers 2571, 2898 and 3701. These specimens might lead one to consider the plant indigenous here. FORREST, however, on another specimen (F. 1010), described as "plant 1 to 2 feet; flowers pink; dry open stony situations around Teng-Yueh; lat. 25° N.; alt. 6,000–7,000 feet," has noted this as "probably an escape from cultivation." His specimen 6530 was collected "in cultivation, villages at north end of Lichiang valley; lat. 27° 15′ N." These Yunnan records may thus all of them refer to naturalized plants. FORTUNE records that during his travels in the south of China he often came upon graves in the most retired places amongst the hills and "was once or twice in the wild mountain districts in the interior at the time when the natives visited the tombs. Even the most retired parts had their visitors and it was both pleasing and affecting to see the little groups assembled round the graves. All were cutting the long grass and weeds which were growing round the tombs and planting their favourite flowers to bloom and to decorate them." These semi-double Anemones may well have established themselves in the wild from plantings originally made on ancient burial grounds high up in the hills. Certainly the Yunnan specimens appear to belong to the same clone as that found by FORTUNE at Shanghai and by THUNBERG at Nagasaki.

(To be continued)

SOME PRELIMINARY INVESTIGATIONS ON THE GROWING OF WALNUTS IN ENGLAND—(1925–46)

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A CHANCE encounter at the Imperial Fruit Show, Manchester, 1923, and a random remark to the late Mr. HOWARD SPENCE of Ainsdale started the systematic investigation into the possibilities of encouraging Walnut growing in England.

In 1924 SPENCE published some notes on Nut growing in the northern United States, tracing the rapid expansion of the industry as a result of the selection and standardization of suitable scion varieties and putting forward a plea for work along similar lines in England. In 1925, WITT, who had already spent much time in improving methods of vegetative propagation in hardy fruit plants, started to collaborate with HOWARD SPENCE.

The first problems were to learn the best methods of propagating selected varieties and clonal rootstocks under English climatic conditions. Although the serious epidemic of late spring frosts did not set in until 1935, WITT soon learned that the budding or grafting of Walnuts out-of-doors was far too chancy to be relied upon for the regular production of young trees. Hence he developed the method of grafting young rootstocks in pots under glass which has already been described elsewhere in detail (WITT, 1938). To-day these methods give anything from 60 to 80 per cent. take provided the scion wood, rootstocks and environmental conditions are good. Even so this indoor handling involves an expensive young tree which, even after it is hardened off and planted out in nursery rows, takes another two or three years before it is sturdy enough to be handled like a timber tree. Nevertheless WITT made it possible to obtain varieties true to name and suitable for English conditions by these methods.

It has not proved so easy to produce clonal rootstocks for Walnuts by layering methods, and though some success in rooting has been obtained with some species of Juglans, and with the hybrids ' Royal ' and ' Paradox ' (*J. californica* × *J. nigra* and *J. californica* × *J. regia* respectively) these have not yet been raised and tested in sufficient quantity for proper trial. Other varieties and species proved far more intractable and it has to be confessed that the comparison of varieties which has been possible has been made upon trees mostly on seedling *J. nigra* rootstocks. The variation amongst these seedlings and their possible influence on the scion are as yet unknown. SPENCE reproduced three striking photographs from America illustrating the effect of *J. regia*, *J. californica* and ' Paradox ' rootstocks on growth vigour of

Placentia Walnut. East Malling plans to develop this aspect further, including growing comparable trees on their own roots.

Why bother to produce an expensive tree under glass when many Continental and American nurseries can graft varieties out of doors? First, many of these varieties are unsuited to our climate. Second, trueness to variety is most important and there appear to be several "strains" or "types" of varieties under a single name, and a recent paper by GLENN (1946) shows that at least on the Continent some of these have become mixed together and differ in important points, although they are grafted trees.

It should be hardly necessary these days to answer the question "Why not grow cheap seedling trees?" If the purchaser just wants to grow a tree all well and good. If he wants to grow good grained walnut wood there is some evidence that clonal material should be used, but if he sets out to grow good quality keeping nuts, he is unlikely, in the light of present knowledge, to produce very many of these from seedlings. That is just why there are so many poor samples of home-grown Walnuts on our English market and we cannot begin to produce a product comparable with the American and best samples of French imported nuts.

The seedling is not really cheap and the grafted clone is not really expensive when it is realized that it may be productive of good or evil fruit for a couple of centuries or more.

In the first 20 years we have had individual trees yielding some 60 pounds of nuts and others which have borne nothing to date. (Fig. 111.) This illustrates the importance of varietal selection.

With the aid of HOWARD SPENCE, the Royal Horticultural Society's Walnut competition in 1929 and the Ministry of Agriculture's horticultural officers, a fairly exhaustive collection of varieties was assembled at East Malling. SPENCE's interests and contacts covered America and even extended to Cyprus, Persia and Kashmir. It was hardly to be expected that many of the varieties from these latter sources suited our conditions. The Society's competition aimed at finding out the best English seedling nuts so that grafts could be taken from the parent trees and clonal races of good performance established.

Several of the outstanding varieties thus discovered are in our recommended list to-day. The owners of the trees were invited to name them and to furnish grafts and they were subsequently presented with young trees in exchange. Similarly the Ministry's inspectorate sought out trees with good local reputations, and now and then a keen grower sent us a variety on his own initiative because it had proved profitable on the market.

Whilst SPENCE was interested in beauty of form and grain of wood and even collected clones to perpetuate these features, his primary object was to find nuts with shells well filled, well sealed and kernels of good flavour and high oil content. Growers of the large maxima or bannut types, which catch the eye and often make a fictitious price, were not infrequently disappointed because their half-filled samples were rejected by the expert.

It is now only 20 years since the investigation began—a mere nothing in the life of a Walnut tree. Incidentally the severe May frosts of 1935, 1938, 1941 and 1944 interrupted the variety trials and also taught us that the most important feature which we had initially to search for was late leafing out. The effect of these late frosts on the young growth, catkins and incipient nutlets has been described in detail by WITT and GLENN (1946) and their observations suggest that it is those trees which bear good quality nuts together with this character of late leafing which should be multiplied and planted in England. This has ruled out a number of well-known Continental and American varieties, whilst others have stood the test comparatively well. Even so, there may still be good indigenous seedlings to be found accentuating this characteristic, and we hope that such varieties may be brought to our notice.

Walnuts are proverbially slow to come into cropping, but one of the reasons—apart from frost—is almost certainly the question of pollination. The facts ascertained at East Malling have undoubtedly made it possible to crop selected clonal varieties in the first ten years or so and even to produce nuts on nursery trees. We have not yet produced a dwarfing precocious effect by rootstock and the value of summer pinching needs further trial. However, some varieties start bearing catkins at an early age, while others bear few or no male flowers for a number of years. Again, the varieties we have studied fall into two groups—those in which the catkins shed their pollen before the female nutlets are receptive (protandrous) and those in which the pistillate flowers begin to be receptive before the staminate flowers are ripe to shed their pollen (protogynous). (Figs. 114 and 115.) However, in this latter group the times more generally overlap sufficiently.

The question is often asked " Why do all my Walnuts drop off while still small ? " Lack of efficient pollination is usually the answer, either because the tree bears no pollen catkins, or because the catkins are not shedding pollen while the pistillate flowers are ripe. The attacks of Bacterial Blight (*Pseudomonas juglandis*) will also cause the nutlets to drop prematurely.

Here then are certain guiding principles to help us draw up that " short list " which the horticulturist is always apt to evade. But there are still other characteristics to help us—notably susceptibility of disease. Between 1930–5 the Ministry of Agriculture made a special grant to Miss J. B. HAMOND (Mrs. M. H. MOORE, Ph.D.) to carry forward our Walnut investigations. At a very important juncture, she discovered the cause of increasing failure in Walnut grafts was due to a readily controlled fungus (*Chalaropsis thielavioides*). Her published work (1935–6) on the Bacterial Blight of Walnuts (*Pseudomonas juglandis*) showed that it was particularly bad on certain varieties—fortunately especially early leafing ones, but that adequate control could usually be obtained by spraying with Bordeaux mixture.

Whilst reserving final judgment for a further 20 years we have found out of the 120 varieties collected at East Malling the following most promising on the standards already mentioned :—

French Varieties :

' Franquette '	(Malling P. 128)
' Mayette '	(Malling P. 11)
' Meylanaise '	(Malling P. 12)
' Treyve '	(Malling P. 13)
' Glady '	(Malling P. 7)

and a variety which we received as ' Chaberte ' (Malling P. 14) though its identity is still in question. The two last are of the maxima type, yet well filled, and they have both cropped comparatively freely and regularly when young.

American Varieties :

The selections ' Leib Mayette ' (Malling P. 103) and ' San José Mayette ' (Malling P. 129) are possibly worth consideration.

English Varieties :

Although the records of the parent trees and the produce therefrom were excellent, most of these varieties have been somewhat slow in cropping. However, we are persevering with :

' Excelsior of Taynton '	(Malling P. 167)
' Northdown Clawnut '	(Malling P. 170)
' Champion of Ixworth '	(Malling P. 172)
' Stutton Seedling '	(Malling P. 171)
' Lady Irene '	(Malling P. 169)
' Secrett '	(Malling P. 150)
' Leeds Castle '	(Malling P. 168)
' Patching '	(Malling P. 149)
' Fertilis '	(Malling P. 20)

Of these ' Northdown Clawnut ' is of the maxima type and has cropped well. ' Stutton Seedling ' has also cropped very well. Both ' Stutton Seedling ' and ' Lady Irene ' have been very subject to Bacterial Blight. ' Secrett ' and ' Patching ' have borne sound shelled nuts even in the wet season of 1946, as did the small ' Fertilis ' selection, which however leafs out rather too early.

' Leeds Castle,' ' Patching ' and the ' Fertilis ' selection were all chosen as possible good pickling varieties. ' Patching ' actually ripens about a fortnight earlier than most other varieties.

Descriptions of all these varieties have been published by Witt (1937) and Glenn and Witt (1946). Of this list the ones we have so far found to be the most promising are the French varieties, ' Franquette,' ' Mayette,' ' Melanaise,' ' Treyve ' and ' Chaberte ' and the English varieties ' Excelsior of Taynton,' ' Northdown Clawnut ' and ' Secrett.' (Fig. 110.) However, we do not propose to discard any of them for at least another decade.

For many years we had a small experimental nursery for the purpose of working up a stock of most of these varieties, and for placing experimental trees in different parts of the country. At the start we sent out very young trees which needed very special care, which we fear in most cases they did not receive, so that our records of many of these early disciples are rather disappointing and incomplete. There is no doubt that Walnuts need very careful transplanting and care for the first year or two. The roots should never be allowed to dry out between lifting and planting.

Our experience suggests that once the main stem is trained to the desired height the less pruning that is done the better. Again, whilst Walnuts benefit from good cultivation and a mulch, forcing manures are inadvisable. Careful staking for the first 10 years appears important.

We are now trying to work up enough suitable scion wood of our selections to supply expert nursery firms interested in the project, but the limiting factor at the moment is the shortage of *J. nigra* rootstocks and seed nuts which we obtained from America.

Worthless young seedling trees can be converted in propitious seasons by patch budding in June-July using the dormant buds of last season.

If the nuts are required for pickling they must be gathered while still young, before the hard shells begin to form—that is before the middle of July.

With regard to the keeping and storing of ripe Walnuts, of course only those with sound and well-sealed shells can be preserved—that is if the depredation of rooks has been forestalled. They particularly like to pierce the nuts as the shells begin to harden. Automatic bird scarers in the early morning will usually suffice.

Nuts for storing should be gathered when the husks begin to split and the husk immediately removed to prevent discoloration. They should then be dipped in water for a few seconds; scrubbed with a soft brush, and then dried in a cool air current. The nuts look much more attractive if treated with a simple bleaching solution. Three pounds of chloride of lime are mixed in a 5 gallon container into a creamy paste. Then two gallons of water are added and well stirred, whilst 1½ pounds of washing soda are dissolved in another container and added to the solution, making the whole up to 5 gallons. After stirring again, this should be allowed to settle for twenty-four hours and the clear liquid is then poured off and is ready to receive the sound nuts for a three minute dip. After this they are drained and dried in single layers at room temperature.

This pleasing looking product can then successfully be stored in earthenware jars with alternate layers of equal parts of salt and slightly damp coconut fibre, and nuts, finishing with a layer of the storage medium. In a cool place, these nuts will remain plump and fresh for twelve months, if rats and mice have been remembered (HAMOND 1933).

SUMMARY

The following aspects are dealt with :

The case for selecting and propagating by grafting varieties of Walnuts suitable to English climatic conditions.

The method of propagation and subsequent cultural treatments.

The importance of late leafing, of early catkin bearing varieties, of pollination, and of well-filled and well-sealed shells.

A list of the most promising varieties under test, and instructions for picking, harvesting, bleaching and storing.

The chief diseases and their control.

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ELECTRICITY IN THE GARDEN

By C. A. Cameron-Brown

(*Lecture given on April* 29, 1947 *:* DR. H. V. TAYLOR, O.B.E., B.SC., V.M.H., *in the Chair.*)

ALL gardeners, both commercial and amateur, have two things in common—they are trying to improve their technique and the scope of their activities while at the same time they are working against adverse conditions of time and labour undreamt of before the war. Consider in particular the amateur, whether he be his own gardener or whether he employ a gardener either whole- or part-time. In the former case, unless he be of some favoured class, he has less time available for his gardening than ever before—the bulging brief-case or the full attaché case going home on the train is no harbinger of leisured hours in the garden. If he be of the latter class he may well have to do with one gardener where once he had two, or with one or two days' work a week instead of whole-time help. Both—and the commercial gardener too—have wondered whether electricity which has revolutionized almost every other industry can do anything to help them.

Proportionately it cannot help them as it has helped other industries, but there are several ways in which it can be put to use to improve the gardeners' lot and yet open up a wide scope for his activities. Probably most important is the provision of heat in the labour-free form of warming the soil and heating the greenhouse ; it also simplifies the sterilization of soil. In the form of light, electricity gives the busy

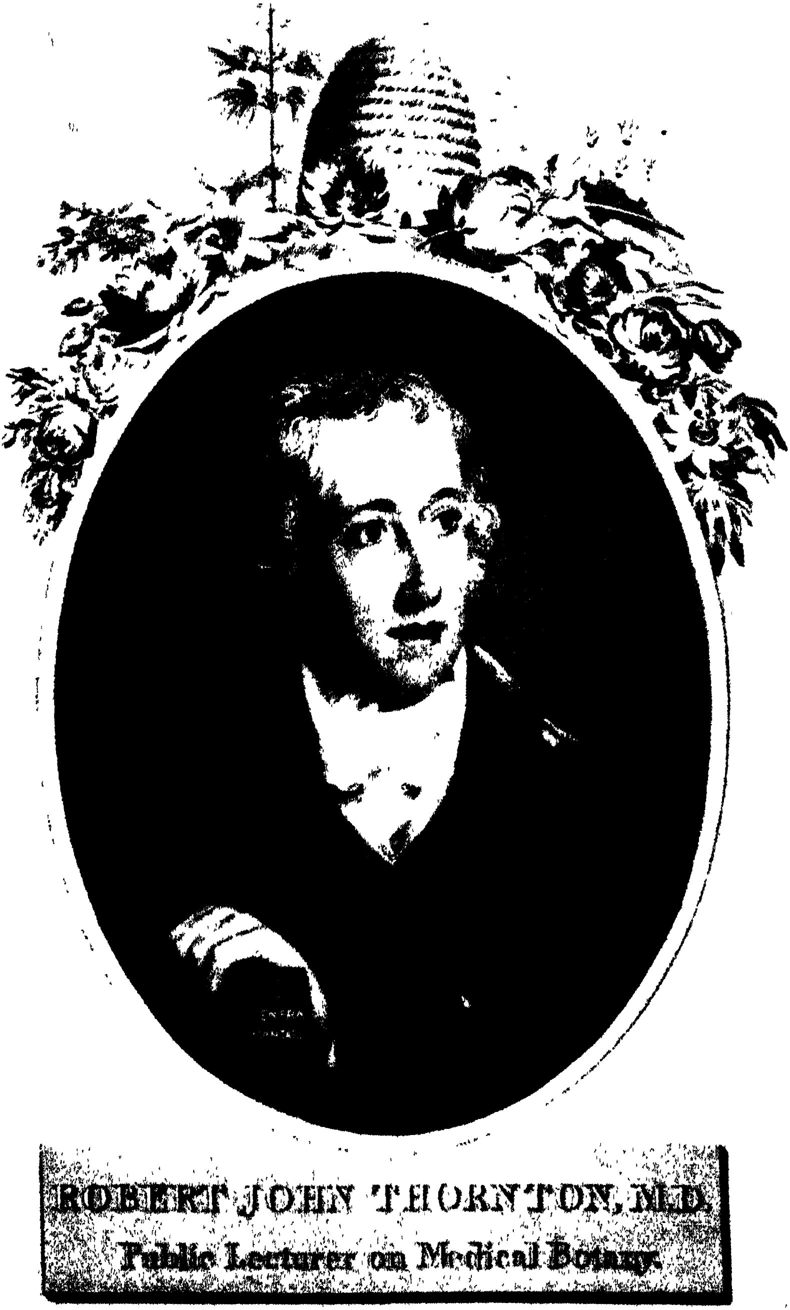
ROBERT JOHN THORNTON, M.D.
Public Lecturer on Medical Botany.

FIG. 106.—Portrait of Dr. Thornton painted by John Russell, engraved by Bartolozzi [from Thornton, "New Illustration"; 1799] (See p. 282)

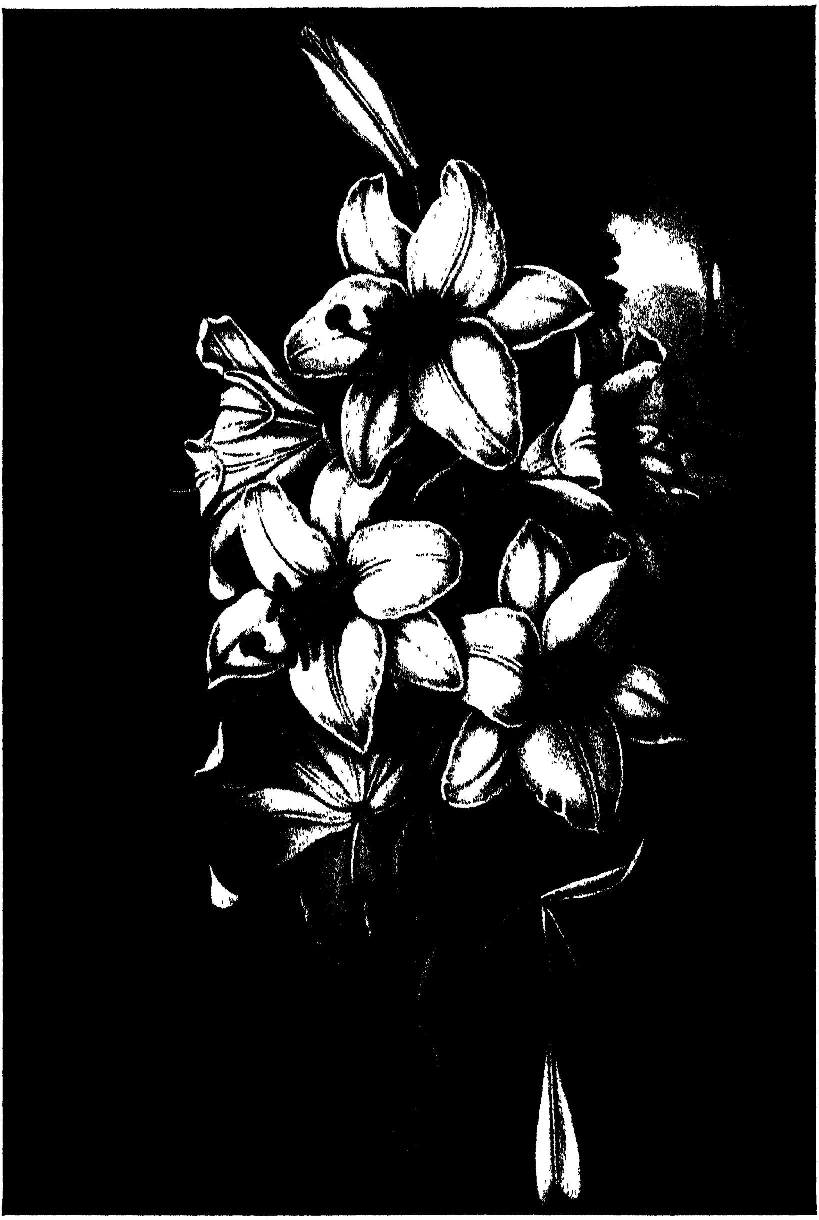

FIG. 107.—"White Lily, or *Lilium album*" (*Lilium candidum*) [from Thornton, "Temple of Flora"; 1800] (See p. 284)

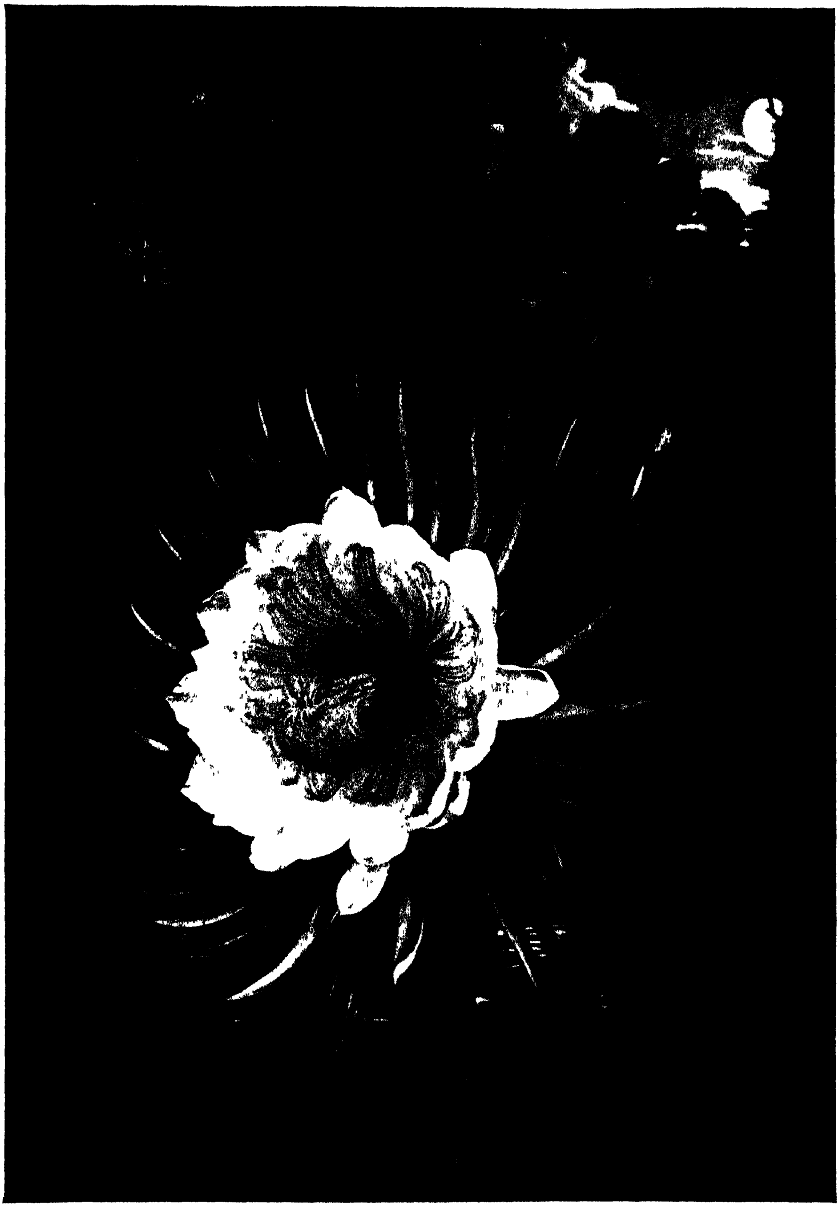

FIG. 108. "Night-blowing Cereus, or *Cactus grandiflorus*" (*Selenicereus grandiflorus*) [from Thornton, "Temple of Flora"; 1800] (See p. 284)

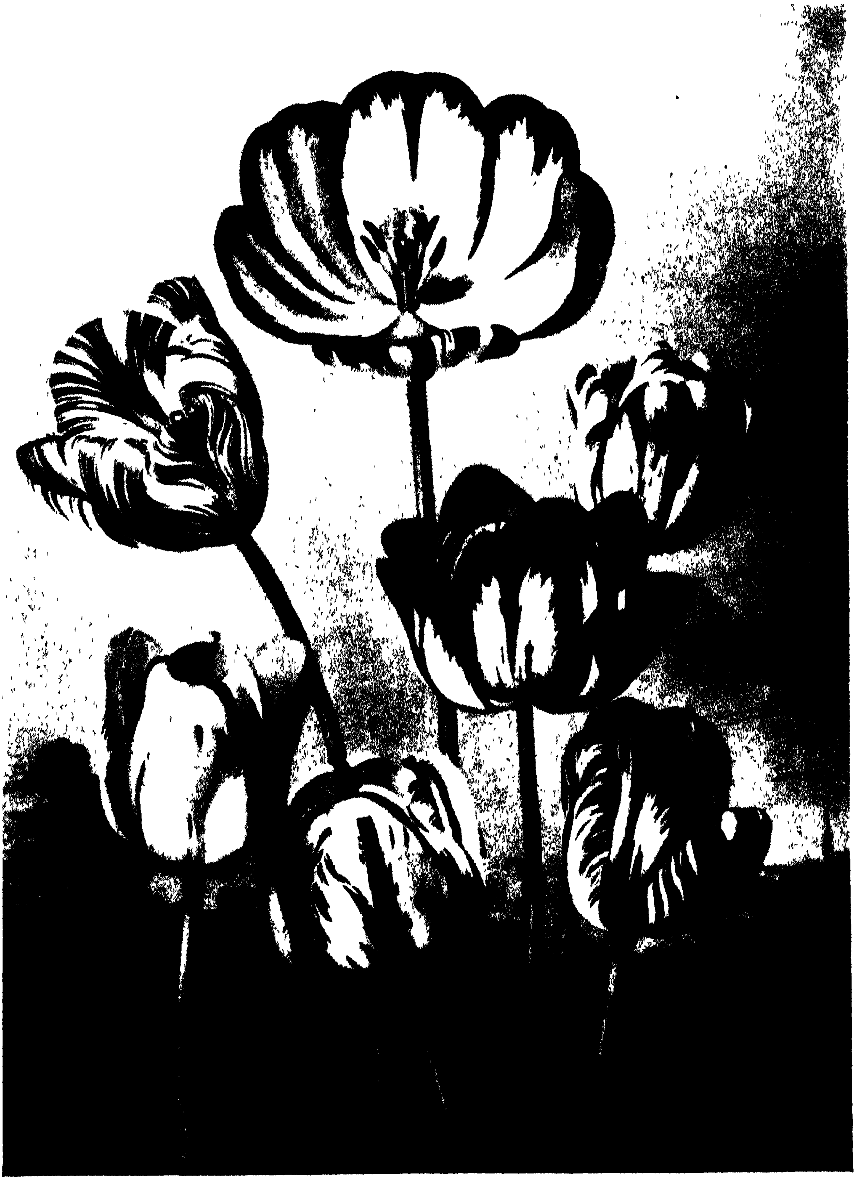

Fig. 109.—"A Group of Tulips," [from Thornton, "Temple of Flora"; 1798]
(See p. 285)

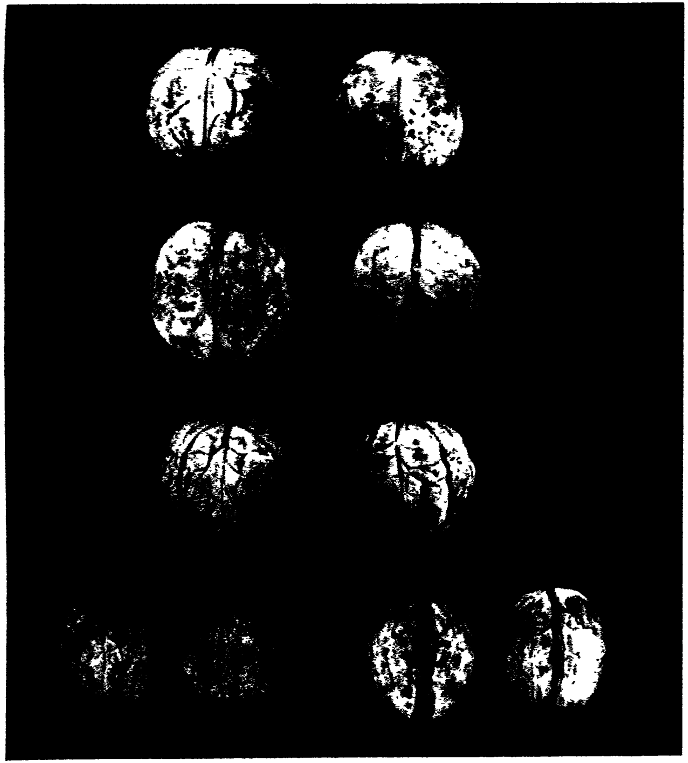

FIG. 110.—Nuts of some French and English varieties *Top row*: ‘Secrett.’ *Second row* · ‘Northdown Clawnut.’ *Third row*. ‘Chaberte.’ *Bottom row*: ‘Franquette,’

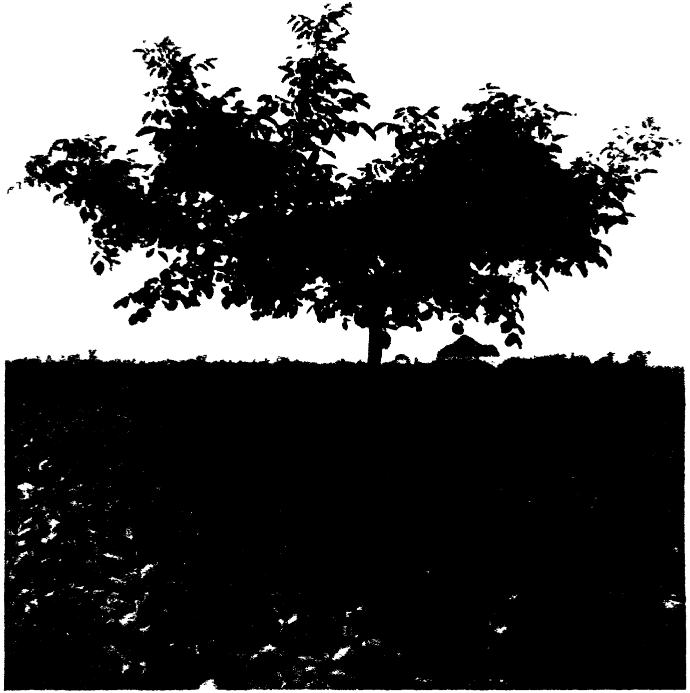

FIG. 111.—Grafted tree of Stutton Seedling at 14 years old carrying 30 lb. of nuts. A seedling tree would almost certainly not carry any crop at this age (See p. 270)

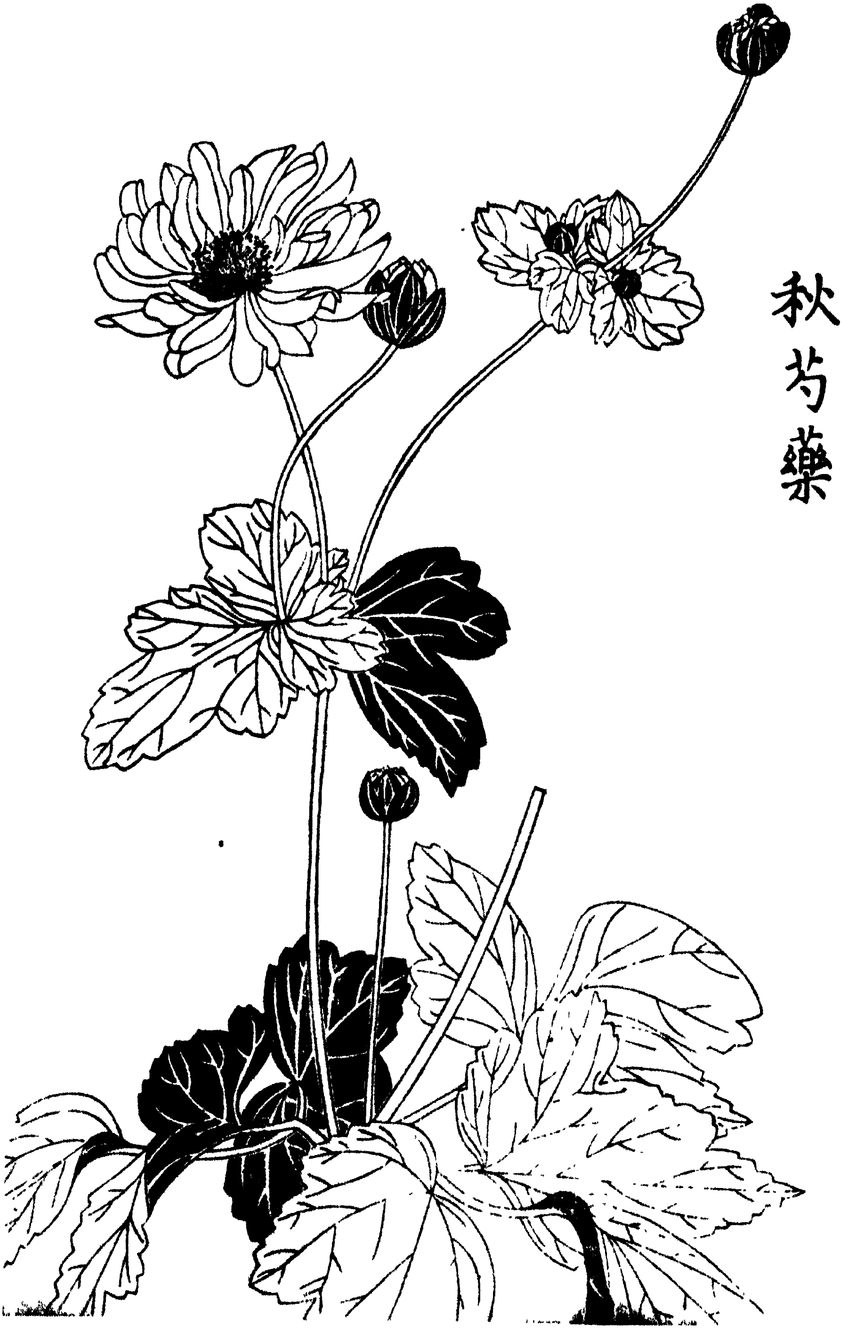

FIG. 112.—*Anemone hupehensis* var. *japonica*
[from Yonan Si, " Ka-i, Kusa," **3**, fol. 19 ; 1765] (See p. 266)

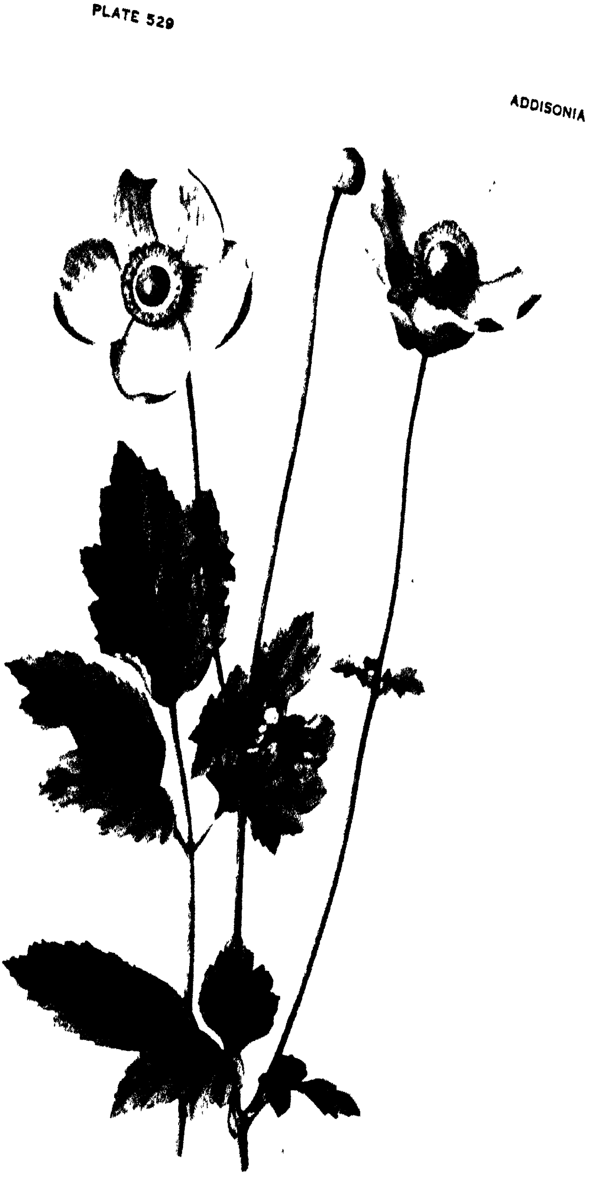

FIG. 113.—*Anemone hupehensis* [from Addisonia, **16**, t. 529; 1931] (See p. 264)

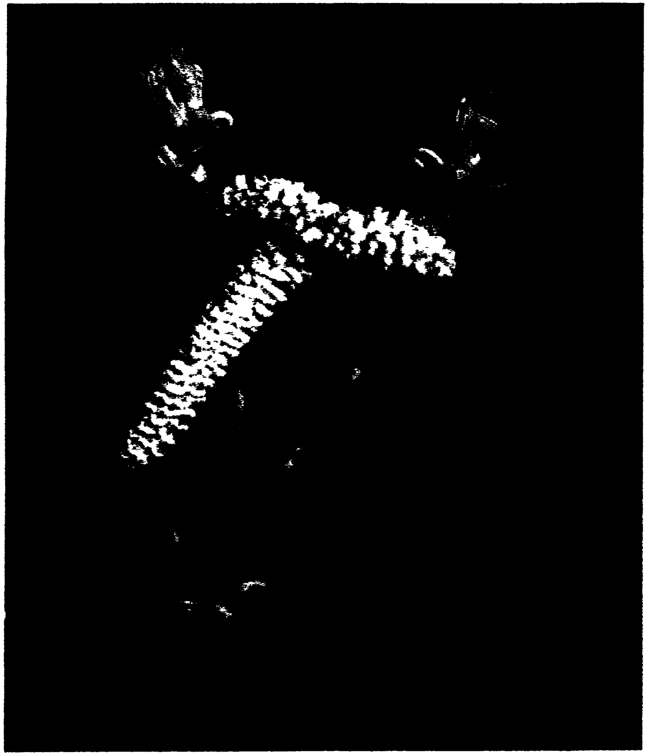

FIG. 114.—Protandrous variety. Pollen catkins ripe before the pistillate flowers (See p. 271)

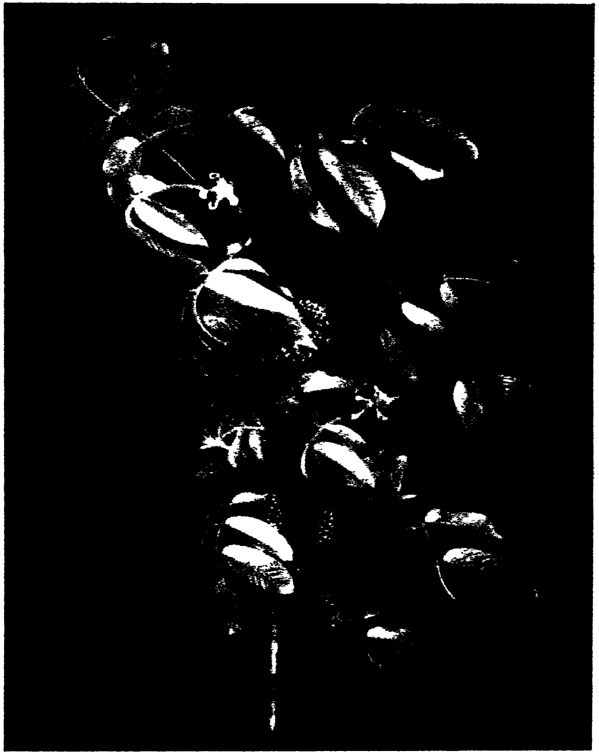

FIG. 115.—Protogynous variety. Pistillate flowers receptive, catkins still unripe (See p. 271)

In neither case will the pistillate flowers be fertilized by pollen from the same tree gardener the chance of doing an hour or two evening work in the greenhouse or potting shed. In the form of motor power it eases the lawn-mowing problem, the pumping of water for watering or for spraying, and we are within sight of an alleviation of the digging problem.

HEAT

Soil Warming

The best return from electrical heat is when it is used in the form of " soil warming." This is essentially the placing in the soil at appropriate depths of heating-wires which warm up the soil to any required degree. It can be applied to provide a " hotbed " on which can be raised salad crops and any of the other crops which are normally grown in frames on warmed soil. It can be applied to form a propagating bed inside a frame, or a propagating bench inside a greenhouse, for the raising of plants from seeds and cuttings. It can be applied to the warming of soil in the greenhouse borders to provide the optimum soil temperature for planting and growing tomatoes or other border crops. It can be applied to warming soil under cloches outside.

There is no mystery about " soil warming " and no peculiar " gain." Any good gardener knows that unless he has to limit his activities to the natural conditions of our cool and wayward climate he must be able to provide some out-of-season warmth in his soil. Electricity offers a handy and economical way of doing this and the gardener can apply it as he thinks fit. There are, however, certain ways of applying it, which have been found to be particularly satisfactory and which will guide the intending user in his own application.

The modern method of soil warming on both large and small scale is by the use of a transformer supplying current at a low and absolutely safe voltage to a bare galvanized or alloy wire laid direct in the soil (all pre-war instructions about laying in beds of sand and so forth should be ignored as being unnecessary and out-of-date). For the amateur the voltage will generally be of the order of 6 volts and an adequate range of transformers of first-class make is now available. The use of thermostats is not recommended and their elimination cuts down the cost of the equipment ; control is effected by switching the current on for a daily running time which depends on the size of bed and bench and the electrical loading involved. All this will be worked out for the gardener by the supplier of the equipment. For this reason, therefore, it is advisable to deal with a local firm of electrical contractors or the local supply undertaking who will advise on the best combination for the particular purpose.

Hotbeds

Where salads and other crops have to be grown the soil-warming wire is laid in the soil at a depth of 6 to 7 inches below the surface of the soil which should in turn be no more than 5 or 6 inches from the glass. When the soil is evened over at the appropriate level the wire recommended is laid evenly, by eye, over the surface, pegged down here and there, and then covered over. In commercial or large private installations where ranges of lights are concerned the wires are generally laid in straight taut lengths in parallel and run, electrically, in a series-parallel arrangement. The loading and the length of wire should come within the following requirements: the spacing between wires should not exceed 12 inches or fall below about 4 inches and the loading should be not more than 5 watts and not less than 2 watts per square foot of soil surface.

The daily running time will be such as to provide a dosage of 40 watt-hours per square foot per day (of 24 hours), raising this to perhaps 50 watt-hours in the North and in Scotland. While this will all be worked out by the supplier the following Table gives a guide to the range covered by the two leading makers of small soil-warming transformers:

TABLE I

Size of Frame	Loading of suitable Transformer	Watts per sq. feet	Daily running Time Hours		Cost per week * (at 1*d*. per kWh)
			South	North	
4′ × 3′	60	5·0	8	10	3½*d*.
5′ × 3′	60	4·0	10	12	4¼*d*.
6′ × 4′	90	3·75	11	13	7*d*.
6′ × 4′	100	4·2	10	12	7*d*.
5′ × 6′	90	3·0	13	16	8¼*d*.
5′ × 6′	100	3·33	12	14	8¼*d*.
5′ × 9′	90	2·0	20	14	12½*d*.
5′ × 9′	100	2·22	18	22	12½*d*.
5′ × 9′	180	4·0	10	12	12¾*d*.
6′ × 8′	•100	2·00	20	24	13¾*d*.
6′ × 8′	180	3·75	11	13	13¾*d*
5′ × 12′	180	3·0	13	16	16¼*d*.
6′ × 12′	180	2·5	16	19	20*d*.

* (In the South).

The main wiring to the transformer should have a switch at a ***handy point*** in the house so that switching can be done without inconvenience. Where a time switch happens to be available this is, of course, the best solution and should always be used on a large installation. If not, however, these various switching times can be keyed to easily remembered daily happenings—"bed-time," "rising," "breakfast-time," "9 o'clock news," etc. Above all they are flexible and nothing very noticeable will occur if they are not adhered to with rigidity. Where the daily times exceed say twenty hours, continuous running is recommended as being simpler.

The technique recommended for the satisfactory use of such hotbeds in early spring is the planting out at Christmas-time of Gotte à forcer or Cheshunt Early Ball lettuce sown in September or October, pricked out and grown-on cold. This should result in availability for cutting from late February or early March. A broadcast undersowing of carrot Harrisons Broadcast or Amsterdam Forcing will give a valuable follow on crop of young carrot. Eight to ten weeks warming should be enough.

Cloche Cultivation

It is, of course, fairly obvious that the gentle warming of the soil under cloches will have a beneficial effect in aiding the advance of growth, in which the cloche technique has been so successful. Transformer operated soil-warming equipment is available to handle cloche layouts. The author has, however, no first-hand experience with soil warming under cloches nor has he yet seen any authoritative figures to indicate the best method of handling soil warming for the purpose. Steps to determine this are now under way and figures will be available in due course. The information which is available from growers would seem to indicate that the equipment should be capable of affording daily " dosages " of at least 50 per cent. more than for equivalent hotbed areas.

Propagating Beds

The procedure is much the same as for hotbeds. In this case, however, an inch or so depth of sand is spread at some 12 inches depth below the top of the frame and the wire duly laid. This is first covered by sand to a depth of 2 inches or so and then by granulated peat to a further 2 inches. This makes a nice bed into which the seed boxes and pans can be shuffled. Loadings and running times should be such as to give 50 per cent. greater daily dosages than for hotbeds ; if in extremely cold weather the bottom temperature so provided is not high enough an hour or two extra daily switching will give this. Whereas, however, in the salad bed there is no need whatsoever to cover the glass at night it is very important to do so in the case of the propagating bed with, probably, its load of precious half-hardies.

The electrically run propagating bed is a particularly profitable investment for both amateur and commercial grower. For example, a 6 feet × 4 feet frame so run will raise a considerable number of plants for a total running cost of about 7*s*. 6*d*. or so during a two-months' run.

Propagating Bench

So often the full heat of a greenhouse has to be turned on just to provide bottom heat under a propagating bench. It is much more satisfactory to provide the propagating bench with its own bottom heat and keep down the main heating—or even run the house cold. For this purpose the bench is laid with corrugated sheeting, slates, tiles or felting on which is laid sand to a depth of 1 inch or so. The wires are then laid as for a propagating bed, covered with sand and peat to a few inches depth. The operation by running time is as for propagating beds and should provide a mean bottom warmth of 55° F.—an hour or two extra daily running will raise this if required. The cost of running a 12 feet × 2 feet bench would be 10½*d*. a week, whereas the extra cost of running the *whole house* at 55° F. or over would be as many shillings or more.

Soil Warming in Beds

Where tomatoes are grown in beds in greenhouses much of the house heating is aimed at raising the soil temperature, which must be of the order of 58° to 60° F. at 6 inches deep for proper planting conditions. To achieve early planting, the cost of running the whole house say at 65° F. to heat the soil is high, whereas by electrical soil warming this can be done in a few hours for a much lower cost. A 12 feet × 2 feet border loaded at 100 watts should be up to planting temperature within 24 hours or so. Not only so, but, by applying the soil warming on the same time basis as for hotbeds during growth, the house can be run at a reduced temperature, so effecting appreciable economy.

Greenhouse Heating

Nothing is more difficult for the amateur than the effective heating of his greenhouse since the small greenhouse is very difficult to control with solid fuel firing. Furthermore the average amateur attempts to run his house at too high a temperature for most of the time in an effort to combat the dreaded chill when his fire is dying down in the grim early morning hours. With electrical heating on thermostat control, however, this does not happen, and so the temperature level can be set more moderately than would otherwise be the case. Dr. W. F. BEWLEY of Cheshunt Research Station, broadcasting on November 24, 1946, stated that most amateur requirements can be met by a house temperature of as little as 45° F. This is indeed so, but, the only practicable way of ensuring this on a small scale, without fear of temperature drop, is by thermostatically controlled electrical heating. Such a house temperature, allied to, say, a propagating bench or bed soil warming gives the amateur tremendous scope and freedom of mind. The importance of keeping the temperature down is, too, reflected in the running costs which are illustrated in Tables II and III. It is also important, too, to be sure of the outside temperature against which the inside temperature is to be maintained; in the author's opinion it is wise to plan against a sustained outside temperature of 20° F. Table II gives some figures worked out for a house measuring 12 feet × 9 feet, all glass with only stump walls, and assuming that the minimum outside temperature will be 20° F, if the target temperatures are to be

TABLE II

Heating of Small Growing House

Maintained Temp. ° F.	Loading kW	Units of Electricity used			
		January	February	March	April
40	3·0	85	127	74	0
45	3·75	296	320	229	32
50	4·5	630	655	518	169
55	5·25	1080	1090	938	468
60	6·0	1625	1670	1440	902

maintained. The consumptions are estimated from an average of the conditions prevailing in the years 1929–33. Table III gives similar figures for a house of the propagating type with low roof and high walls and 9 feet wide. The tables will demonstrate clearly enough the economic advantages of keeping the temperatures as low as possible.

TABLE III

Heating of Small Propagating House

Maintained Temp. ° F.	Loading kW	Units of Electricity used			
		January	February	March	April
40	2·0	63	93	55	0
45	2·75	220	238	170	24
50	3·25	466	487	385	126
55	3·75	805	810	696	348
60	4·5	1210	1240	1070	670

For instance, in the propagating house, the difference for March between running at 45° F. and 55° F. is £2 3*s*. 10*d*. at 1*d*. per unit, for this period the two 12 feet × 3 feet benches could be warmed to 55° F. for 11*s*. 1*d*. By the way, these estimates of running costs are based on conditions at Kew and will be easier west and south of there and heavier to the north and east ; they also apply too where the greenhouse has a normal semi-sheltered southerly aspect.

The actual heating of the house is effectively done by rustproof tubular heaters spread out along the sides and low down. Where there are benches a space of at least 6 inches between the back of the bench and the wall should be arranged to allow the warm air from the heaters to rise freely (Fig. 1). The thermostat should be of a waterproof type.

(Note : all costings have been taken at 1*d*. per unit ; electricity is widely available in urban areas at less than this.)

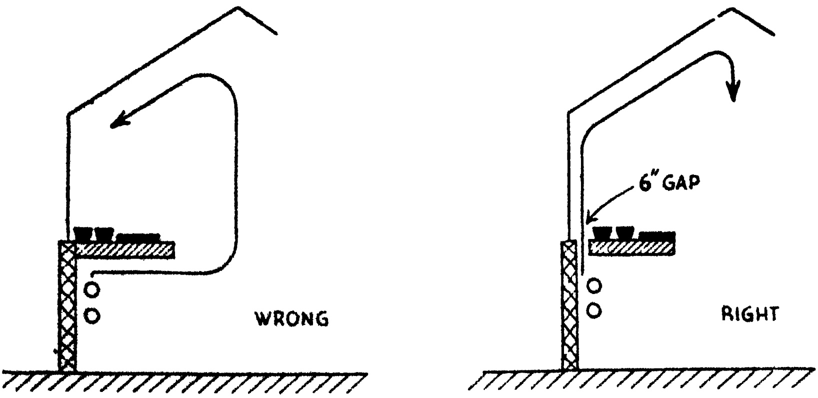

FIG. 1.—Right and Wrong methods of heating in benched houses.

Soil Sterilizing

Thanks largely to the good work of Messrs. Lawrence and Crane of the John Innes Institution, the amateur gardening world is becoming really appreciative of the advantages of sterilized soil for composts. Unfortunately, however, the methods open to the amateur are clumsy and not always satisfactory—indeed, the use of the cooker and the wash-boiler with the inevitable leavings of gritty soil has often led to domestic differences. While, therefore, electrical methods have much attraction for the commercial grower, they are almost the only practicable and effective method open to the amateur. One method at present available is the electrode method, whereby the electric current actually passes through the soil itself. A new method is, however, coming along which bids fair to be a more convenient and satisfactory method for the amateur. Unfortunately it has just reached the end of its experimental development and public disclosure is not yet permissible. If the editor permits, it may be possible to mention this new method in a later issue of the JOURNAL as a rider to this paper.

POWER

Lawn-mowers

While the engine-driven mower is a godsend to the man with a very large lawn they are generally too large and too expensive to be practicable for the man with the medium-sized lawn. For this purpose the electrified lawn-mower is a god-send, being comparatively inexpensive and light to handle. There is no need with the 12- or 14-inch mower to use the motor for propulsion. Once the cutting cylinder is driven by the motor the pushing of it is easy ; furthermore if only the cutters are driven it is easier to handle the mower in awkward corners, under overhanging branches, etc. The handling of the flexible cable is mastered in a few minutes and is no trouble provided the lawn is not studded with small rose beds. By the way, motorization is a particular boon to the gardener who has bought an eight-bladed mower and who finds it harder going than he expected.

Hedge-trimmers

Another direct labour—and back—saver is the electrically-driven hedge-trimmer. Perhaps an expensive item for the man with only a medium hedge it is an obvious piece of equipment for joint ownership by several gardeners.

Pumps

Many a gardener could, and would, make more use of salvaged water—rain water, filtered bath water, etc., but for the subsequent bucketing and carrying involved. Small pumps capable of pumping 300 gallons per hour or so are quite inexpensive and revolutionize such practice. They can also be used for ornamental fountains and waterfalls.

Fuel Restrictions

The conscientious gardener may well be impressed by the fact that much of the emphasis of this paper is on methods of applying electric *heat* and he may well wonder just how this accords with the present unfortunate national fuel and load situation. In the first place the paper is presented as a vehicle for conveying technical information and takes the long-term view that the present situation is temporary and that we are in an all-electric age where requirements will be fully satisfied in due course. In regard to the present state of affairs, however, the author has to remind private gardeners of the ban in force for some time on the use of *any form of heating* except for the growing of tomatoes, lettuces, mustard and cress and for the raising of young vegetable plants. It is doubtful, too, whether any authority would take exception to the gardener who while mainly meeting these conditions slipped in a box or two of flower seeds or seedlings.

The author must, too, point out that much of the heating to which he refers—hot beds, propagating beds, propagating benches—can be run with the heat on at night only which is a form of loading which satisfies the authorities. In any case, it is a general requirement that any new electrical connection shall be reported to the electrical supply undertaking, and in the case of any new heating application they are best consulted before the event rather than after.

DR. THORNTON AND THE "NEW ILLUSTRATION" 1799–1807

By F. M. G. Cardew

ONE of the great possessions of the Lindley Library is Dr. THORNTON'S *New Illustration of the Sexual System of Linnaeus* and *Temple of Flora*, published in London 1799–1807. The scientific, the classical and the romantic are combined in this magnificent folio, which reflects the whole culture of its time and was intended to appeal to the F.R.S., the fashionable lady, and the gentleman of taste, alike. It is not proposed here to enter into the bibliography of the book, which is extremely confused, but only to give the ordinary reader some idea of its author, content, and general character.*

ROBERT JOHN THORNTON (Fig. 106) was the son of a miscellaneous writer, BONNELL THORNTON, who attained considerable success as a journalist in the middle of the eighteenth century ; and the son seems to have inherited a good deal of his father's temperament, though he was himself trained to the medical profession, and made his living by it. He was born about 1768, studied at Guy's Hospital, took his M.B. at Cambridge, travelled on the Continent, and in 1797 began to practise in London. Later he became lecturer in medical botany at

* I am indebted to Mr. W. T. STEARN for the botanical names of the plants

the united hospitals of Guy's and St. Thomas's. But while still in his twenties he had planned the production of his great work, the *New Illustration,* which began to come out in parts in 1798/99, and alongside of it he was publishing parts of several other large works, notably of the *Philosophy of Botany, or Botanical Extracts.* He prepared, in fact, in the early years of the century, a vast amount of material, particularly in the way of folio plates and portraits, which later he used in various combinations in his various publications and in various copies of the same publication—a practice which makes the bibliography of his works almost impossible to disentangle.

His ambition for the *New Illustration* was high. The best artists, engravers, versewriters and typographers were employed : the paper was of the finest, and the size of page the largest as yet used in an English publication. Apart from the fact that he drew one of the plates himself—and that the Roses, the most famous of all—the standard of excellence which he exacted throughout the work is proof enough that THORNTON possessed artistic sensibility and judgment in a very high degree. He achieved the perfection he aimed at, but the cost ruined him before he could complete the work as originally planned, and the *Temple of Flora* is cut short with 31 plates out of the 70 that should have been. In 1811 he obtained permission of the King to hold a lottery of his botanical works in an effort to retrieve his finances, and twenty thousand tickets were issued at 2 gns. each. The first prize was the original pictures for the plates ; the others, copies of the publications themselves, or sets of the plates, and lastly, a smaller quarto edition of the *Temple.* In this the majority of the flower plates appear, re-engraved with some degree of alteration and on a smaller scale, but the workmanship is infinitely below that of the original publication. In spite of this lottery, however, THORNTON died a poor man in 1837.

The *New Illustration* was dedicated to the First Lady, QUEEN CHARLOTTE, and opens with three fine portraits :—of THORNTON himself, by RUSSELL ; of LINNAEUS, after HOLLMAN and BARTOLOZZI ; and of HER MAJESTY, after BEECHEY. In his Dedication to the QUEEN, THORNTON explains that his object was to commemorate THEIR MAJESTIES' patronage of " all the useful and ornamental sciences " and to bring the Arts into the service of Botany as they had formerly served to illustrate and embellish Poetry, History and Religion. After some pages of botanical explanations and definitions follows " The Prize Dissertation on the Sexes of Plants," which is a translation of LINNAEUS'S *Disquisitio* addressed to the Russian Imperial Academy of Sciences in 1759/60. In one of his fine sub-titles THORNTON had designated the *New Illustration* as " A British Trophy in Honour of Linnaeus." But in his footnotes to this translation—which form a running commentary longer than the text—he strongly asserts the claim of MILLINGTON and GREW to be considered the actual discoverers of sex in plants, and notices also the observations of VAILLANT and GEOFFROY. He even himself suggests (in Pt. 2) a Reform of the Linnaean System ; so his veneration was by no means blind.

The Second Part of the book cannot be noticed here owing to lack of space. It also was scientific in character. In some copies it does not appear at all, whereas in one of the Lindley Library copies it contains not only the scientific text, but the fine series of Portraits and Botanical Plates which are also found as illustrations to the *Philosophy of Botany*. Both series are of value, and the portraits of particular interest.

In the Third Part, or *Temple of Flora*, Science appears as a fairy tale, or classical myth. Through LINNAEUS's work, the existence of sex in plants had become well known outside strictly scientific circles, and the idea still deeply intrigued the ordinary intelligentsia. For its appearance in literature it is unnecessary to go further than ERASMUS DARWIN. In his *Botanic Garden* and *Loves of the Plants*, published in 1789/91, he had treated the subject in exactly the same spirit as that in which THORNTON was now presenting it. But DARWIN certainly felt no grudge, for he became one of THORNTON's chief versifiers in the *New Illustration*. The idea was in the air for anyone to use. The letterpress of this part, accordingly, consists first of a botanical description of the plant in question, with a statement as to its country of origin and manner of introduction into England. Then comes verse in which the flower, usually personified in classical manner, is described, or apostrophised, or its legendary lore recalled. The poets drawn on are numerous—ANACREON, VIRGIL and OVID in translations (especially OVID); translations from the Sanskrit by Sir WILLIAM JONES (the first great English Oriental scholar, who had died only a few years before); poems from SHAKESPEARE, PRIOR, THOMAS MOORE, BURNS, HENRY JAMES PYE (the Poet Laureate of the day), and other living verse-writers no doubt well known to THORNTON's subscribers. But apart from DARWIN, his great standby for modern verse was Dr. GEORGE SHAW, of the British Museum, who apparently never failed to produce appropriate stanzas when required.

THORNTON's own part again lay in the extensive Footnotes, which wander off into discourses on all sorts of subjects, having only the remotest connection with the plant in hand. Thus the Indian Reed (*Canna indica*) is somewhat strangely made the occasion of a description of Suttee and a discourse on the Hindu, Persian, Egyptian and Greek religions; the group of Lotuses (*Nelumbo nucifera* and *N. lutea*) gives rises to a further seven or eight pages on the same subject as well as on the religions of Tibet and Japan; and the Egyptian Lotus (*Nymphaea caerulea*) to extracts from NELSON's despatches on the Battle of the Nile.

This curious medley would hardly attract us to-day but it all hangs upon the great colour plates, which form the chief glory of the work, and in which Romance comes into its own. Among the artists were REINAGLE Senior, PETER HENDERSON and PETHER; among the engravers, DUNKARTON, BARTOLOZZI, EARLOM and WARD. One plate, the Cereus, was even the work of two artists—REINAGLE being responsible for the flower, and PETHER for the "moonlight" or background. The process used for reproduction was usually mezzotint, or aquatint, printed in colour, and finished by hand. Apart from one or two introductory plates of an allegorical nature, the subjects portrayed are all flowers, either an English garden flower or an " exotick," and these are often shown in their natural habitat, or as near their natural habitat as the artist cared to visualise. The scene is always distant, and the difference in scale between flower and setting immense. But according to garden theory of the time, the flower should not only delight by its beauty but arouse an appropriate sentiment in the breast of the beholder. And therefore in a number of cases the plant is shown in a more or less imaginary setting, designed to enhance its particular character and spell.

An instance of more or less realistic setting is the Rose plate, which is almost cloying with its compacted sweets—the Rose, the nightingale, the nest of eggs half-hidden under leaves, the dragonfly, the sun rising in splendour—the whole essence of Midsummer in the framework of one folio page.

In other plates realism is sacrificed to imaginative value. A plate of this sort is the Night-blowing Cereus (*Selenicereus grandiflorus*) with its full moon, owl, and church-clock striking twelve. Against this almost supernatural background the great flower breaks in white and gold, seeming to shed a light of its own. The suggestion of midnight and mystery is admirable, but the Cereus does not bloom in the open in this country, and ancient church towers of the kind shown do not exist in the Tropics. Nobody, however, could wish this plate altered ; it creates a reality of its own. (Fig. 108.)

Another with somewhat the same atmosphere and the same splendid contrast, is the Madonna Lily (*Lilium candidum*). Against a sombre background,where nothing is clearly visible except a temple or mausoleum in one corner, the white flower rises " like a ghost from the tomb." (Fig. 107.)

Sometimes the suggestion is not so clear, for instance, in the case of the American Cowslip or Shooting Star (*Dodecatheon Meadia*). According to American botanists the habitat of this plant is " woods and prairies " but here it grows amongst the seaweed on a rocky coast, with sailing ships tacking in the distance. THORNTON himself, however, says elsewhere that the setting is meant to suggest that the plant came from overseas ; and that the American flag on the ship is an indication that it came from America ! The flag, in fact, is far too small to show its nationality, even if that had been enough to explain the plate.

Again, the pink and the yellow Lotuses (*Nelumbo nucifera* and *N. lutea*) are shown together on one plate against an Egyptian background, though neither is a native of Egypt. This is because of the traditional association of the ' Lotus ' with Egypt, though the Egyptian ' Lotus ' is actually a Nymphaea. THORNTON himself says this is " painter's licence," that the pink Lotus is not " now " found in Egypt, and that he is doubtful whether the yellow is ever found outside America.

Outstanding amongst the Exoticks is the sinister Dragon Arum

(*Dracunculus vulgaris*) reproduced by Mr. P. M. SYNGE with the Cereus, Stapelia, and others of the Exoticks in his ***Plants with Personality***.*

The setting of the Exoticks is usually realistic, sometimes fantastic and ugly. But that of the garden flowers—Hyacinth, Carnation, Snowdrop—is always delightful. There is a variety of subjects to please all tastes; some may admire most the magnificent simplicity of the Tulips (Fig. 109) which even a touch of gigantism cannot vulgarize. This fine plate called forth a rival. For SAMUEL CURTIS, planning his *Beauties of Flora*, published in 1806 a superb Tulip plate, which much resembles THORNTON'S in general character, and even surpasses it in vigour and stateliness. But the collection for which CURTIS intended this plate was not published till many years later, and though a few prints of the Tulip plate exist, the Lindley Library unfortunately does not possess one.

The book ends with THORNTON'S Apology to his Subscribers for its untimely termination. And the Apology ends with the line of HORACE which says " It is possible to go so far, if one may not go further." All who know this great work will be thankful that he managed to achieve as much as he did.

NOTES FROM FELLOWS

The Lost Scent of Mimulus moschatus

DURING the B.B.C. luncheon hour programme, entitled " Country Questions," on Sunday, March 16, Mr. ERIC HOBBIS responded to an enquiry about the lost scent of the Musk plant (*Mimulus moschatus*) —a horticultural puzzle of long standing. An interesting history of the plant was given, but no explanation of how its scent came to be lost.

When I was a small child (I was born in 1879) the scented form of *Mimulus moschatus* was grown in almost every cottage garden and window box, on account of its delightful and characteristic fragrance. For many years now, no one has experienced this perfume. But to say that the Musk plant has lost its scent may possibly be more accurately expressed by stating that its scented form has been lost to cultivation.

Mimulus moschatus of DOUGLAS grows wild about Revelstoke on the Columbia River, and in other places in the Selkirk Mountains, but is scentless as a wild plant. The late Sir ARTHUR HILL, then Director of the Royal Botanic Gardens at Kew, in his Presidential Address before Section K (Botany) of the British Association at Bristol, in 1930, stated that, as a result of exhaustive enquiries in Great Britain and in North-West America, *it had been established that Musk plants with the old-fashioned and distinct fragrance were no longer to be found even in their native habitat.* It should be mentioned that there is no field note on *M. moschatus* in DOUGLAS' *Journal* (published by the Royal Horticultural Society), the name appearing only in an Appendix, entitled "Plants introduced by David Douglas during the years 1826–34." He may not have seen it flowering in the wild state, collecting its seed only later in the season.

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* A number of the plates were also reproduced by Mr. G. DUNTHORNE, in " Flower and Fruit Prints of the Eighteenth and early Nineteenth Centuries," but the stock of this book was destroyed in the air-raids and it is practically unobtainable.

A scented form occurred among plants grown in the R.H.S. Garden at Chiswick from the seed which DOUGLAS sent home in 1826. This "sport," if such it was, doubtless sprang from one seed only, and would subsequently have been reproduced by vegetative reproduction—a simple procedure in the case of Mimulus (seedlings might be expected to revert to the normal scentless type). A plant, such as the Musk in question, may be divided almost *ad infinitum.* Yet the various portions, though divided, are all parts of one individual plant and will all eventually perish. Similarly, Lombardy Poplar, Irish Yew and Dawyck Beech—each one derived and reproduced vegetatively from a single fastigiate individual—will, I suppose, all in time disappear, unless a similar sport occurs again in nature or in cultivation. But the life of a tree is, of course, longer than that of a herb. (It may be noted that seedlings from seed of the upright Irish Yew grow into ordinary spreading Yew trees. The Lombardy Poplar is a male tree and produces pollen only. The Dawyck Beech is quite sterile and produces neither flowers nor fruit.)

Some of these scented plants, derived from DOUGLAS' seed, were sent from Great Britain to the United States, New Zealand and other parts of the world, but such scented forms were everywhere unobtainable in the early years of the present century.

In BRITTON and BROWN'S *Illustrated Flora of the Northern States and Canada, M. moschatus* is said to be "musk scented"; but this may have been merely copied from its official description. The latter was written in Great Britain, and presumably made, doubtless in error, from the *scented variety* instead of from the *unscented type* of the species.

The scent can no longer be detected in LINDLEY'S type specimens in the Cambridge University Herbarium; but they, like those of some other of DOUGLAS' introductions, are believed to have been made from plants grown in Great Britain from seeds sent home from America by the collector.

Assuming that this suggested solution of the problem is the correct one, the *occurrence* of the scented form of *M. moschatus* was a more remarkable event than its *disappearance,* which was to be expected if the precipitate nature of its first appearance is taken into consideration.

SINCE the above paper was sent to the Editor for publication, my attention has been called to the following evidence that a scented form of the Musk plant once grew wild in its native country.

After Sir ARTHUR HILL had delivered his address to the Botanical Section of the British Association in 1930, he received a letter from Mr. W. B. ANDERSON, of Victoria, British Columbia, an authority on the British Columbian flora. Mr. ANDERSON wrote to say that he had received a letter from the Lieutenant-Governor, stating that long ago at Millstream, where Musk was indigenous, all the plants were scented ; and moreover that the Millstream area was far away from any habitation, so that the scented plants could not have been introduced there. (See *Gardeners' Chronicle*, Sept. 23, 1930, p. 259.)

If the scented form of *M. moschatus* occurred first in the wild state in N.W. America and then later under cultivation in England, there would appear to be a reasonable hope that under favourable circumstances it might crop up once more, either in the wild state or under cultivation in its native land or elsewhere. For while some sports, such as Irish Yew and Dawyck Beech, occur so rarely as to appear unique, others, such as Copper Beech, occur more frequently and even in some cases come true from seed.

But, unfortunately, there is no great inducement to cultivate the scentless form of *Mimulus moschatus*. For, with its small flowers and lack of fragrance, it is of little horticultural value, as compared with its more spectacular relatives, *M. luteus*, *M. Langsdorffii* and *M. cardinalis*.

W. BALFOUR GOURLAY, M.C., M.A., M.B., B.Ch.

Epimedium pubigerum

While all those on the look-out for ground cover as a means of reducing labour will find the Epimediums helpful allies, many of this genus are so invasive that they cannot be planted without cautious deliberation. But there is one of them we have had for a good many years which is content to spread so slowly that it may be said to remain in a moderate self-contained clump without showing aggressive inclinations. This is *Epimedium pubigerum*. From Mr. W. T. STEARN'S admirable monograph, *Epimedium and Vancouveria*, I gather this species was first introduced by Miss WILLMOTT in 1887, later by Mr. E. K. BALLS. It seems to enjoy a wide range in the wild, embracing Transcaucasia, north Asia Minor and south-eastern Europe. Hardy and easygoing in our rather moist, but light, lime-free soil, it is quite satisfied with life among some Rhododendron bushes where it gets practically no sun and nothing more in the way of nutriment than natural leaf-fall. The evergreen leaves are a rich green and leathery with paler underparts, the three to five leaflets being broadly ovate or heart-shaped. These rise in a dense mass on wiry stalks to well over a foot, and clear above them in early May stands a sheaf of flowering stems bearing ivory-yellow blossoms with slightly red-flushed sepals. If this species lacks the colour of some it has a stateliness of port, a bold and enduring foliage and in its tall and erect inflorescences there is a luminous quality which will not be passed unobserved in its shady retreat.

A. T. JOHNSON.

Ginkgo biloba L.

In the account of Ginkgo, which appeared in this JOURNAL in April 1943, I was unable to give any information about the tree in the University Botanic Garden at Utrecht in Holland. Of this tree LOUDON in his *Arboretum et Fruticetum Britannicum*, published in 1838, tells us that it was 33 feet in 1816 and was then supposed to be 70–80 years old. Therefore in 1837 it must have been 90–100 years old. I have recently been in communication with the Director of the Utrecht Botanic Garden, Prof. Dr. A. A. PULLE who writes :—" The Ginkgo biloba in the botanical garden of the University of Utrecht is still a nice tree. It is a male tree with one female branch at 12 m. above the ground. The tree has male flowers every year, but fruits on the female branch are rare and they do not germinate."

I may be forgiven, if I repeat a few of the dates given in my original paper. Ginkgo was discovered in Japan by KAEMPFER in 1690, he published his account of it in *Amoenitates Exoticae* in 1712. According to LOUDON it was introduced into Holland between 1727 and 1737, when the Dutch were in close touch with Japan. It will be seen therefore that this tree in Utrecht may well be the first tree introduced into Europe from Japan.

EDWARD CAHEN.

AWARDS TO PLANTS IN 1947

Brassolaeliocattleya ' Nugget.' A.M. April 15, 1947. A large and attractive flower. The white sepals and petals are tinged with pale mauve at the tips, while the expansive labellum is lilac with a golden throat area. The result of crossing *Blc.* ' Palmyra ' with *Lc. luminosa.* Raised and exhibited by Messrs. Sanders, St. Albans. (See p. lvi.)

Camellia ' St. Ewe.' A.M. April 1, 1947. Like the previously certificated hybrids ' J. C. Williams ' and ' Mary Christian,' this arose from a cross made by the late Mr. J. C. Williams between *Camellia japonica* and *C. saluenensis*. In the exhibitor's garden it forms a neat, freely-branching shrub up to 15 feet in height with lustrous deep green leaves 2 to 3 inches long ; and bears a succession of broadly cup-shaped flowers about 3½ inches across, each having about nine oblong-elliptic petals, in colour Rose Madder (H.C.C. 23/2), and a central cluster of bright yellow stamens. Exhibited by C. Williams, Esq., M.P., Caerhays Castle, Gorran, Cornwall. (See p. liv.)

Cattelya ' Enid ' var. Rivermont. A.M. February 18, 1947. A large and showy flower, with pure white sepals and petals and an expansive labellum which is mottled with bright purple. The result of crossing *C. Mossiae* var. *Reineckiana* with *C. Warscewiczii* var. ' Frau M. Beyrodt.' Exhibited by Mr. Clint McDade, Chattanooga, Tennessee, U.S.A. (See p. xlviii.)

Cattleya 'Gloriette' var. 'Rivermont.' A.M. January 14, 1947. The spike bore three large flowers of rosy mauve colour, the expansive labellum crimson-purple and having a golden throat. The result of crossing *C. Hardyano-Warneri* with *C.* 'Tityus.' Exhibited by Mr. Clint McDade, Chattanooga, Tennessee, U.S.A. (See p. xlvi.)

Cymbidium 'Bodmin Moor' var. 'Grace.' A.M. April 1, 1947. The spike bore seven well-formed flowers, which are white, with light-greenish shading. The result of crossing *C. Alexanderi* with *C.* 'Erica Sander.' Exhibited by Mr. Clint McDade, Chattanooga, Tennessee, U.S.A. (See p. liv.)

Cymbidium 'Imbros.' A.M. March 18, 1947. The spike bore ten well-formed flowers, creamy-white with pale pink suffusion, the apex of the labellum spotted with crimson. The result of crossing *C. Lowianum* with *C.* 'Rosanna.' Raised by Messrs. Sanders, St. Albans, and exhibited by Read's Hybridizing Nurseries, Hockley. (See p. lii.)

Cymbidium 'Innamorata' var. 'Lycaste.' A.M. March 4, 1947. The tall spike bore three well-formed flowers of a pleasing light rose-pink colour, the labellum of deeper pink with numerous reddish spots. The result of crossing *C.* 'Dante' with *C.* 'Rosanna.' Exhibited by Messrs. Black & Flory, Slough. (See p. l.)

Cymbidium 'Nefertiti' var. 'Celeste.' A.M. April 15, 1947. A charming hybrid between *C.* 'Pervaneh' and *C. Alexanderi*. The erect spike bore 11 well-formed whitish flowers, the labellum spotted with crimson. Raised and exhibited by Messrs. H. G. Alexander, Tetbury, Glos. (See p. lvi.)

Cymbidium 'Queen Elizabeth' var. 'Enchantress.' A.M. March 4, 1947. The spike bore twelve blush-white flowers, the front lobe of the labellum heavily marked with bright red. Obtained by crossing *C.* 'Olympus' with *C.* 'Flamingo.' Raised and exhibited by Messrs. H. G. Alexander, Ltd., Tetbury, Glos. (See p. l.)

Cymbidium 'Starlight.' F.C.C. February 18, 1947. This vigorous plant bore a spike of eight large and well-formed flowers, the labellum being unusually expansive, profusely spotted with dark crimson, and having an attractive yellow crest area. The sepals and petals are blush-white. The result of crossing *C.* 'Jason' with *C.* 'Letty.' Exhibited by Col. the Hon. H. S. Tufton, Castle Hill, Englefield Green, Surrey. (See p. xlviii.)

Cymbidium 'Swallow' var. 'Oriole.' F.C.C. April 1, 1947. The graceful spike bore thirteen large flowers of light clear yellow colour, the front lobe of the labellum marked with crimson. Raised and exhibited by Guy P. Harben, Esq., Colbury House, Totton, Hants. The parents were *C. Pauwelsii* and *C. Alexanderi*. (See p. liv.)

Cypripedium 'Banchory' Dukes Edge var. A.M. January 14, 1947. This attractive flower has a greenish dorsal sepal and the petals and labellum yellowish shaded with brown. Obtained by crossing *C.* 'Grace Darling' with *C.* 'Dickler.' Exhibited by N. M. Jensen, Esq., Dukes Edge, Woldingham. (See p. xlvi.)

Cypripedium 'Harmachis' var. 'Golden Radiance.' A.M. January 14, 1947. A charming flower, mainly of honey-yellow colour. Raised and exhibited by Messrs. H. G. Alexander, Ltd., Tetbury, Glos. The parents were *C.* 'Gwen Hannen' and *C.* 'Selene.' (See p. xlvi.)

Cypripedium 'Helas,' 'Westonbirt' var. F.C.C. February 18, 1947. A large and well-developed flower of artistic coloration. The colour is mainly yellowish-green tinged with brown, while the dorsal sepal has a broad white margin. The result of crossing *C.* 'Desdemona' with *C.* 'Tania.' Raised and exhibited by Messrs. H. G. Alexander, Tetbury, Glos. (See p. xlviii.)

Cypripedium 'Whitehall' var. 'Pleiades.' A.M. January 14, 1947. A well-formed flower in which the dorsal sepal is white with a greenish base and marked with small spots. Produced by crossing *C.* 'Mrs. J. Branch' with *C.* 'Conference.' Raised and exhibited by Messrs. Sanders, St. Albans. (See p. xlvi.)

Daphne Mezereum alba 'Bowles' Variety,' A.M. April 1, 1947. *Daphne Mezereum* is highly esteemed among early-flowering shrubs for its generous display of fragrant, rosy flowers. The present variety is white-flowered and yellow-berried, and grows vigorously and rapidly, eventually reaching a height of 5 to 6 feet. Exhibited by E. A. Bowles, Esq., M.A., F.L.S., V.M.H., Myddelton House, Bulls Cross, Enfield. (See p. liv.)

Lycaste 'Sunrise' var. 'Fiona.' A.M. March 4, 1947. A well-shaped flower in which the broad sepals are greenish-white, the petals and labellum pure-white. The result of crossing *L. Skinneri alba* with *L. Imschootiana*. Raised and exhibited by McBean's Orchids, Ltd., Cooksbridge, Sussex. (See p. l.)

Magnolia mollicomata 'Lanarth.' F.C.C. April 15, 1947. Only two flowers were exhibited of this lovely variety, which was raised at Lanarth from seed collected by Forrest (No. 25655). The flower consists of twelve sepals and petals, the largest of which are ovate, about 4½ inches long and nearly 2½ inches wide, and of an unusually dark colour, Cyclamen Purple (H.C.C. 30/3), with a central cluster of even darker stamens (30/1). Exhibited by M. P. Williams, Esq., Lanarth, St. Keverne, Cornwall. (See p. lvi.)

Magnolia Sargentiana var. **robusta. F.C.C.** April 15, 1947. This is one of the most beautiful of the 'pink'-flowered Chinese Magnolias. The flower, which opens before the leaves unfold, is made up of twelve sepals and petals, the largest of which are narrow-obovate, 5 inches long and half as wide, thick and of waxy texture, coloured Mallow Purple (H.C.C. 630/3) on the outside, somewhat deeper at the base and paler inside. Exhibited by Lord Aberconway, C.B.E., V.M.H., Bodnant, N. Wales. (See p. lvi.)

Magnolia Sprengeri diva Seedling. A.M. April 29, 1947. The original tree of *Magnolia Sprengeri diva* is at Caerhays Castle in Cornwall, and it was from material from this tree that the description and figure in the *Botanical Magazine* (t. 9116) were prepared. The present plant is a seedling raised by the late Mr. J. C. Williams from the original. It has flowers composed of twelve concave petals of oblanceolate or spathulate shape and up to 4 inches long, spreading as the flower ages and emitting a scent, unusual in the genus, recalling Hawthorn. Externally the colour is light Solferino Purple (H.C.C. 26/3) fading to Claret Rose (021/3) ; inside almost white, flushed pale rose. Exhibited by Lord Aberconway, C.B.E., V.M.H., (See p. lx.)

Narcissus 'Cragford.' F.C.C. February 18, 1947, as a variety for forcing for market. This fine Poetaz variety received an **A.M.** as a variety for forcing for market on February 19, 1946. Raised by the late P. D. Williams and shown by Messrs. G. Zandbergen-Terwegen, Sassenheim, Holland. (See vol. LXXI, p. 205, and vol. LXXII, p. xlix.)

Narcissus 'Golden Torch.' A.M. April 1, 1947. A refined Incomparabilis variety (Division 2a) with flowers about $4\frac{5}{8}$ in. in diameter, well poised on a stout 19-in. stem. The broad, smooth overlapping perianth segments were Mimosa-yellow (H.C.C. 602), the outer ones being $1\frac{7}{8}$-in, long and $1\frac{11}{16}$-in. wide. The neat corona was lemon-yellow (H.C.C. 4/4), $1\frac{7}{16}$-in. long and $1\frac{7}{8}$-in. broad at its expanded frilled margin. Raised by the late Brodie of Brodie and shown by Mr. Guy L. Wilson, Broughshane, co. Antrim. (See p. liv.)

Odontonia 'Cephelia.' A.M. April 1, 1947. The tall spike carried nine flowers in which the sepals and petals are golden-yellow with red-brown markings. The labellum is creamy-white. Raised and exhibited by Messrs. Charlesworth & Co., Haywards Heath. The parents were *Odontoglossum* ' Celius ' and *Odontonia* ' Ophelia.' (See p. liv.)

BOOK NOTES

"Over to Flowers." By M. James. 91 pp. 8vo Ill. (Lutterworth Press, London.) 7*s*. 6*d*.

This book is intended for those, young and old, who want to grow flowers and know little about it. Children can understand it and older folk, who do not disdain simple language giving clear and accurate directions on how to do things, can learn from it too, with the certainty that there will be little to unlearn if its directions are followed. There are many pleasant and useful sketches of plants and operations (but that depicting digging on p. 17 needs a little study and the two on p. 58 are upside down), and some coloured illustrations of gardens. We can recommend this as a good book to start with. So much of the essentials has the authoress been able to incorporate without going into confusing details or attempting to deal with special phrases of gardening that it will take the beginner far along the right path. F. J. C.

" An Introduction to Agricultural Chemistry." N. M. Comber, H. Trefor Jones and J. S. Willcox. 315 pp. 8vo. (Edward Arnold & Co., London. 1947.) 8*s*. 6*d*.

This small text book was designed to cover the requirements of those studying for Degree or Diploma examination in Agriculture ; it does not cater for the horticultural student especially, though much of the ground covered is common to both. The first part of the book deals with the soil and is in fact an abridgement of the senior author's most useful introduction to the Study of the Soil. With true economy of words, it deals with the nature of soil material, the colloidal and physical properties of soils, plant nutrients, and their availability.

The second part of the book, in some fifty pages, reviews the principles of manuring and the use of fertilisers. Here brief reference is included to some newer materials —to " triple phosphates " for example, to the addition of borax and also the value of magnesia limestones; but their horticultural value for fruit or vegetables does not receive adequate attention for gardeners. The third part of the book concerns topics, of which the majority lie outside the scope of horticultural interest, but in this part the reader will find a neat and brief introduction to the vitamins. Insecticides are not dealt with, owing to the recent rapid developments.

The publishers have kept the price within the range of students, who should be grateful to them for this consideration and to the authors for the clarity of their writings. M. A. H. T.

" *p*H and Plants." By J. Small, D.Sc., Ph.D., F.R.P.S., M.R.I.A., F.R.S.E. (Baillière, Tindall & Cox.) 12*s*. 6*d*.

As is well known " the term *p*H is used to replace the cumbersome term—hydrogen-ion activity—which is what is really measured and spoken of as hydrogen-ion concentration or degrees of active acidity or *p*H "—thus the author introduces the reader to his book. Few readers will disagree with him when he further states that " *p*H is a factor which is nearly as widely important as temperature in many biological and industrial processes."

After a general chemical introduction, Professor Small considers the intensity of the acidity observed and recorded in the sap of many plants in regard to seasonal variation, to the systematic classification of the plants, and to other points. He revives interest in the question of the *p*H and the colour of flowers whose different anthocyanins react characteristically as natural indicators showing by colour changes the intensity of acidity; these changes were studied by Buxton and Derbyshire in the Society's Laboratories (1929), and reported in this JOURNAL and elsewhere. Other biochemical topics discussed concern the activity of enzymes or ferments, and the protoplasmic membranes, in relation to acidity.

Subsequent chapters are more concerned with the natural environment of plants—with the *p*H of the water in which aquatic plants and fish live. There is also a chapter of particular value to horticulturists to which attention is now drawn; it deals with the measurement of the soil acidity in regard to the occurrence and growth of acid-loving and alkaline-tolerant plants. There is a useful selected bibliography and an index.

The book is recommended to students possessing the necessary chemical knowledge—fortunately many undergraduates reading for degrees in horticulture enter the University with such training—but the average Diploma student of horticulture may well find the text rather difficult. M. A. H. T.

" Old Fashioned Flowers." By George M. Taylor. (John Gifford.) 7*s*. 6*d*.

This little book contains interesting essays on a variety of flowers, many of which have been long neglected but which are now becoming popular again. Such are the Auriculas, the double Daffodils and the old Dianthus. Roses are not dealt with in this book since the publication of Mr. E. A. Bunyard's book *Old Garden Roses* covers this ground. There is perhaps undue emphasis on the activities of Scottish groups such as the Paisley weavers but their efforts undoubtedly resulted in many fine varieties. The standard of production of this book can only be described as deplorable and this decreases considerably one's pleasure in a text deserving of a better setting. Illustrations are also greatly needed.

ERRATA

Page 217: *Col. F. R. Durham* retired from the Secretaryship in March 1946 and not 1945 as stated.

Caption to Fig. 98 should read *Agave americana* and not *Aloe americana*.

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JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

Vol. LXXII Part 8

August 1947

THE SECRETARY'S PAGE

Subscriptions.—Fellows who have friends who are thinking of joining the Society are reminded that, as half the year has passed, anyone elected after the end of June is required to pay only half a year's subscription in respect of the remainder of the current year. The Secretary will be pleased to send a form of application for Fellowship on receipt of a postcard.

Programme of Meetings.—During August and September there will be the following Meetings and Shows :—

Tuesday, August 12—12 noon to 6 P.M.
Wednesday, August 13—10 A.M. to 5 P.M.
Tuesday, September 9—12 noon to 6 P.M.
Wednesday, September 10—10 A.M. to 5 P.M.
Tuesday, September 23—12 noon to 6 P.M.
Wednesday, September 24—10 A.M. to 5 P.M.

In conjunction with the meeting on September 9 and 10 there will be an Exhibition of Municipal Horticulture in the Old Hall.

Competitions.—At the Show on August 12 and 13 there will be a competition for the Foremarke Cup for Gladioli. On September 9 and 10 there will be three competitions for amateurs, a Cactus and Succulent Competition, a Flower Arrangement Competition and a Plum Competition. For schedules of all these competitions application should be made to The Secretary, Royal Horticultural Society, Vincent Square, S.W. 1.

Lectures.—There will be no lecture on August 12, but in conjunction with the Show on September 9 a Conference on Municipal Horticulture will be held in the Lecture Room of the New Hall at 3 P.M. On September 23 a lecture will take place at 3 P.M. in the Lecture Room of the New Hall. The lecturer will be Mr. M. B. Crane, F.R.S., V.M.H., who will talk on "The Fertility Rules in Fruit Planting," a subject which will be of particular interest to members of the Fruit Group.

Kindred Societies' Shows.—The National Dahlia Society is holding a Show in the New Hall on Thursday and Friday, September 4 and 5, to which our Fellows' and Associates' tickets will admit. On Tuesday, September 16, the National Chrysanthemum Society will be holding a Show in the New Hall, and on Friday, September 19, there will be a Show in the New Hall organised by the National Rose Society. Fellows' and Associates' tickets will not admit to either of the two latter Shows, but admission may be obtained on payment at the door.

Demonstrations at Wisley.—The following demonstrations will take place at Wisley during August and September, the demonstration on the second day being in each case a repetition of that given on the first :—

Flower Garden

Wednesday and Thursday, August 6 and 7.—Vegetative Propagation of Shrubs and Herbaceous Plants (2–4 P.M.).

Vegetable Garden

Wednesday and Thursday, September 17 and 18.—Harvesting and Storing (2–4 P.M.).

Distribution of Seeds from Wisley.—Last year the response from Fellows to the appeal for surplus seeds for distribution from Wisley was excellent. It is hoped that once again any Fellows who have such seeds from their gardens, especially of good or unusual plants, will be kind enough to collect them and send them, carefully labelled with the name of the plant, to the Director, R.H.S. Gardens, Wisley, Ripley, Woking, Surrey.

Tomato Spraying.—The attention of Fellows is again drawn to the importance of spraying outdoor Tomatoes as a protection against Potato Blight disease which rapidly destroys Tomato fruits. Spraying is done with one of the well-known copper-containing sprays now sold for the purpose. It should be done when the plants have reached their required height and have been "stopped." At Wisley in a normal season one good spraying applied the first week in August has been sufficient, but in a wet season it may need to be repeated. In Wales and the West country two sprayings are probably necessary, and the first one would fall due much earlier in the season. We consider this spray treatment of the utmost importance for outdoor Tomatoes.

General Examination Results.—At the General Examination in Horticulture, held on March 27, 1947, there were eight hundred and ninety-nine candidates, of whom four hundred and eleven were successful, fourteen being placed in Class 1, eighty-eight in Class 2, and three hundred and nine in Class 3. Four hundred and eighty-eight candidates failed to satisfy the examiners.

At the General Examination in Horticulture for Juniors, *i.e.* those under eighteen years of age on March 1, which was also held on March 27, 1947, there were three hundred and eight candidates, of whom one hundred and eleven were successful, six being placed in Class 1, thirty-seven in Class 2, and sixty-eight in Class 3. One hundred and ninety-seven candidates failed to satisfy the examiners.

Both these examinations consisted of written work only.

Queen's Institute of District Nursing.—Fellows of the Society are reminded that very many beautiful gardens throughout the country are open to visitors at various times during the year in connection with the above charity. The admission fee of 1*s*. is generally payable and all proceeds are handed over to the Institute. This affords an excellent opportunity of seeing gardens which are not at other times accessible to the public.

Lists of gardens and the times at which they are open can be obtained from the Organising Secretary, National Gardens Scheme, "Craigleith," Kersfield Road, Putney, S.W. 15.

WISLEY IN AUGUST

THE chief attraction in the Gardens this month will be the Herbaceous and Annual Borders and the trials and collections of these plants, which will be found both on the Floral Trial Grounds and beneath the old Apple trees behind the Herbaceous Borders. The majority of shrubs will now be out of flower and some will be showing their first-ripened fruits to remind us of the approach of autumn. Careful note should be taken of those in flower during this month and next to enable future plantings to be so arranged that they give a continuous display of flower until the frost; the glut of spring-flowering subjects so often planted leaves nothing but dull walls of green throughout the summer months. Much can be done even with such collections to introduce summer-flowering subjects by careful thinning and replanting, or beds in front of the spring shrubs can be filled with a few of the dwarfer summer-flowering shrubs, such as Hydrangeas in many varieties, hardy Fuchsias, deciduous Ceanothus, Caryopteris and Spiraeas of the japonica type. These, together with permanent beds of free flowering herbaceous perennials, will give a continuous display of bloom throughout the summer with a great saving of labour as compared with the more elaborate bedding schemes of earlier days.

On entering the Gardens visitors will see the first flowers opening on *Perowskia atriplicifolia*, a small shrub from the Himalayas, with scented grey leaves and violet blue flowers, produced over a long season. Planted against the wall of the laboratory are two further free-flowering shrubs, *Abelia Schumannii* and the hybrid × *A. grandiflora*, but they are only suitable for more sheltered positions, both have freely-produced pink or pink and white flowers, but the latter has generally a longer flowering season. Here also will be found the orange-red trumpets of *Campsis chinensis* (*Tecoma grandiflora*), an interesting climber for a sheltered wall, but one requiring more sun, than our usual weather permits, to become really free-flowering.

Leaving the Laboratory we pass along the Rose Walk, noticing particularly the 'Poulsen' and Polyantha Roses still giving their continuous display of flowers, and, turning to the left, we can examine the trial of Calendulas and Nasturtiums in the Floral Trial Grounds near the Dahlia border, and the early flowering Chrysanthemum trials on which the first blooms are just appearing.

The Annual Border noted last month is now in full flower; this display should continue until late September, while the large collection of Roses will also continue to be a feature of interest.

The Alpine House, although now past its best, still has some interesting plants in flower, including a number of Campanulas, and the small succulents *Crassula Cooperi* and *C. sarcocaulis*, with the small pink Japanese *Thalictrum kiusianum* and the delicate pink sprays of *Limonium* (*Statice*) *ornatum*, while the orange-red fruits of the creeping *Nertera depressa* add further colour to the display.

On the Rock Garden the brilliant blues of the summer-flowering *Gentians*, particularly *G. Farreri*, *G. ornata* and *G. gracilipes* provide the dominant colour, toning with the pink 'scrambler,' *Convolvulus althaeoides*. The orange-scarlet of *Zauschneria mexicana* makes a gay display this month, especially if planted on a sunny and well-drained ledge.

On the Alpine Meadow the clumps of *Yuccas* often flower freely at this season. Following the hard winter, however, a reduced display owing to the damaged flower spikes must be expected, but the large shrub of *Clethra alnifolia* will be in full flower.

The Wild Garden contains many naturalised plants of the Willow Gentian (*G. asclepiadea*) in both its blue and white forms, while the climbing *Tropaeolum speciosum* will also be found here; the bright scarlet flowers are quite dazzling when seen in full sun. In some gardens this species is difficult to establish, while in others its vigour and underground rhizomes cause embarrassment. The chief shrubs in flower at this season include many of the species of Hydrangea which thrive in thin woodland, particularly *H. quercifolia* and *H. serrata*, while *H. paniculata* var. *grandiflora* and many varieties of *H. macrophylla* (Hortensia) will be found in other parts of the Gardens.

To all who know Wisley the twin herbaceous borders backed by Yew hedges are the chief point of interest at this season. It is worth paying careful attention to the methods of staking used, and to any specially pleasing colour combinations seen in the planting, which can be of great assistance in designing improvements for our own gardens.

In Seven Acres many of the earliest fruiting Berberis are already carrying their mature berries, while the main shrubs in flower include the very useful *Hypericum patulum* var. *Forrestii*, planted both here and in greater numbers near the Fuchsia borders, and the smaller but free-flowering *H. prolificum.* The Buddleias of the Davidii group also produce their sprays of purple or lilac pink flowers at this season; generally rampant growers they require hard pruning in the spring if they are not to become leggy and too spreading with age. The lower-growing and less rampant var. *nanhoensis* is well adapted for smaller gardens. A more recent introduction to this group is the hybrid

× *B. Weyeriana*, intermediate in character between *B. Davidii* and *B. globosa*. Good Spiraeas for this season are *S. Billardii*, with pink pyramidal inflorescences, and the taller-growing white *S. arborea*, while the dwarf pink *Spiraea* 'Anthony Waterer' is too well known to need description.

The Heath Garden will be gay with the many varieties of our native Heathers and Ling; 'St. Dabeoc's' Heath, recovering slowly from the harsh winter, will be producing a few of its purple bells.

Returning to the Award of Garden Merit Collection, two valuable flowering shrubs attract our attention, *Fuchsia magellanica* var. *riccartonii*, generally regarded as the hardiest of the hardy Fuchsias, and *Eucryphia glutinosa*, covered with its large white Hypericum-like blooms, a wonderful sight in full flower; it does not thrive on limy soils. Another *Eucryphia* of considerable merit is planted in the Wild Garden, the evergreen × *E. nymansensis*, a hybrid between *E. glutinosa* and *E. cordifolia*, which, in spite of browning of the foliage by frost, promises to give a fair display of flowers.

The Vegetable Trial Grounds which are open on Mondays to Fridays until 5 P.M. and on Saturdays until 12 noon, are now a growing source of interest with the maturing of the crops. The trials of Runner Beans, and Vegetable Marrows will certainly be worth visiting, while the trial of outdoor Tomatoes should be ripening their first fruits during the early part of the month. Other points of interest include the Celery and Parsnip trials and the many samples of seed on trial for the Seed Import Board.

THE HISTORY OF ANEMONE JAPONICA

By E. A. Bowles and W. T. Stearn

PART II

FOR at least twenty years before the August 1842 Treaty of Nanking opened the ports of Canton, Amoy, Fuchow, Ningpo and Shanghai to British traders, the Horticultural Society of London had in its possession several hundred coloured drawings of Chinese plants made at Canton. They served as a continual reminder of the wealth of plants that might be introduced into British gardens from China by a plantsman of enterprise, resource and experience. Such a man was ROBERT FORTUNE (1812–1880), Superintendent of the Hot-house Department of the Society's Garden at Chiswick. The Nanking treaty provided the long-awaited opportunity. FORTUNE accordingly went to China in 1843, commissioned by the Society "to collect seeds and plants of an ornamental or useful kind, not already cultivated in Great Britain." Although he never travelled far inland and obtained most of his plants from Chinese gardens and nurseries, he was extremely successful, largely because he so thoroughly studied and so efficiently practised the art of packing his plants to withstand the vicissitudes of the long, leisurely voyage from China. As already mentioned, he found the semi-double *Anemone japonica* at Shanghai in November 1843. Living plants reached the Society's garden at Chiswick in June 1844 and flowered there in the August of 1845. JOHN LINDLEY at once had the plant drawn by Miss S. A. DRAKE and published her coloured illustration in the *Botanical Register*, **31**, t. 66 (December 1845). This plate constitutes the earliest record of *A. hupehensis japonica* (syn. *A. nipponica*) in English gardens. Other coloured illustrations appeared later in *Bot. Mag.* **73**, t. 4341 (1847), HARRISON, *Floricult. Cabinet*, **15**, 289 (1847), PAXTON, *Mag. Bot.*, **14**, 25 (1847), MAUND, *Bot. Garden*, **12**, no. 1105 (c. 1850), LOUDON, *Orn. Greenhouse Pl.* t. 5 (1848), and elsewhere. All portray the same semi-double form. FORTUNE did not penetrate far enough inland to come across any wild single-flowered 'Japanese Anemone.' It is certain that this semi-double one was the only one he introduced.

A. japonica was at first supposed to be best treated as a greenhouse plant, but by 1847, as GEORGE GORDON (1806–1879), Superintendent of the Ornamental Department at the Society's Garden, wrote in *Journ. Hort. Soc.*, **2**, 301 (1847), it had " been ascertained to be perfectly hardy under all circumstances " and had " proved itself to be one of the most desirable of herbaceous plants for autumn decoration . . . quite a rival for the purple Chinese chrysanthemum, its rosy purple semidouble flowers being each nearly 3 inches in diameter, and elevated to a height of 2 or more feet." GORDON noted that " seeds are only produced by plants grown in the green-house, and therefore the plan of raising plants in this way is not worth time and trouble, except that there are chances of obtaining new varieties. I have but little doubt such may be obtained by hybridizing the Japan anemone with such kinds as the large white *A. vitifolia*, from the north of India, or the common garden *A. coronariâ*." It is clear that GORDON had already crossed *A. japonica* with *A. vitifolia*, for a hybrid of this parentage raised at Chiswick was exhibited in September 1848. A. *vitifolia* (Fig. 117) is a rather tender species with a wide distribution along the Himalaya, from Hazara and Kashmir eastward to Sikkim, Bhutan, Assam and Upper Burma ; it also occurs in Yunnan but not elsewhere in China. It was introduced by Lady AMHERST from Nepal about 1829. Coloured illustrations in *Bot. Reg.* **16**, t. 1385 (1831), *Bot. Mag.*, **62**, t. 3376 (1835), and MAUND and HENSLOW, *Botanist*, **1**, t. 9 (1837), vouch for its presence in British gardens at this period. It resembles *A. hupehensis* and var. *japonica* in general habit but has pure white, usually 5-tepalled flowers and may be recognized by its rather broad, constantly undivided, never trifoliolate, deeply lobed, vine-like leaves (Diagram 1). The junior author has collected luxuriant specimens in Sikkim between Chungthang (5,350 feet) and Lachung (8,800 feet) with blades a foot across on petioles 2 feet long. *A. hupehensis* and var. *japonica*, like *A. tomentosa*, usually have leaves with three leaflets (Diagr. 1, D), although they sometimes produce undivided leaves of *vitifolia* pattern. They are much hardier than *A. vitifolia* which in the Himalaya seems never to ascend into the upper regions of severe climate and which has never established itself permanently outdoors in British gardens. It is, however, a handsome

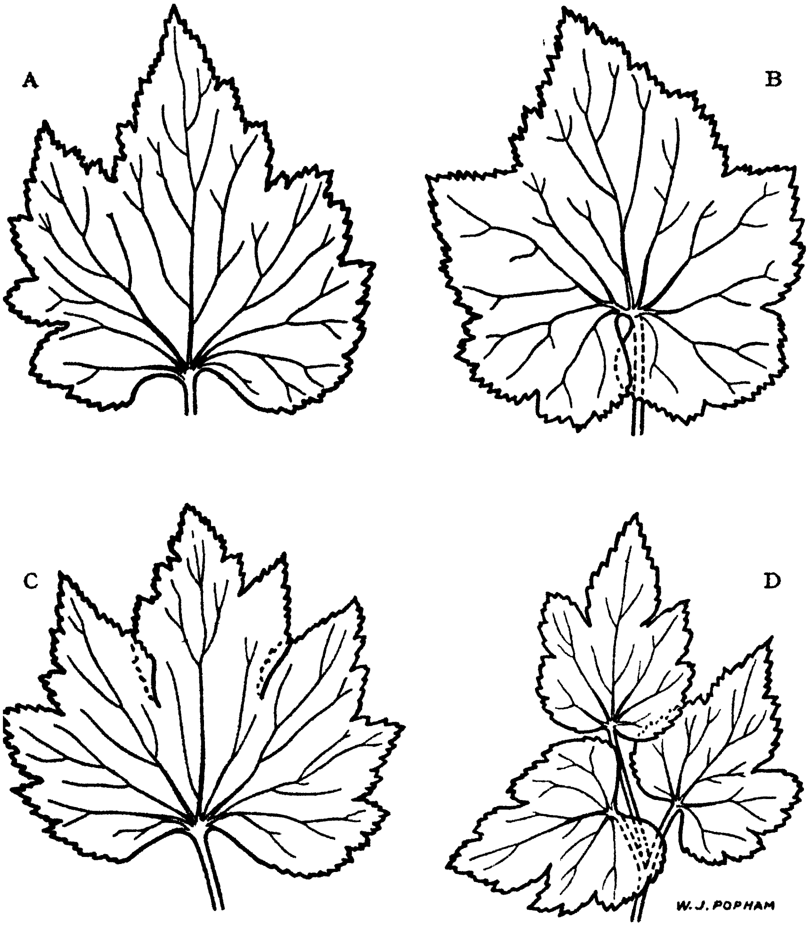

Diagram 1.—A–C, Unifoliolate leaves of *Anemone vitifolia* (Western Himalaya) ; D. trifoliolate leaf of *A. hupehensis* (Chienshih Hsien, Hupeh, *H.C. Chow* 1356). Drawn from specimens in the Edinburgh Herbarium.

plant, though Farrer, who found it " general all over the lower grassy hills and hot open slopes of the valley region " at 6,000 to 8,000 feet around Hpimaw, northern Upper Burma, considered it " far inferior to the pink Kansu-Tibetan forms," *i.e.* the allied *A. tomentosa.*

A plant from the Society's garden described as a hybrid between *A. japonica* and *A. vitifolia* was exhibited before the Horticultural Society on September 5, 1849, *i.e.* only four years after the first flowering of *A. japonica* in cultivation. The account in *Journ. Hort. Soc.*, 4, lxxvii (1849) reads as follows : " A hybrid variety of *Anemone japonica,* produced between that sort and the white Indian *A. vitifolia.* The result was an improvement in the shape of the flowers, but they were much paler than those of the Japan Anemone."

The first coloured plate is that labelled *A. japonica* var. *hybrida* in MOORE and AYRES, *Gardeners' Magazine of Botany*, **I**, t. 2 (1850). This (Fig. 118) shows two expanded flowers, one with nine obovate perianth-segments, many round buds and one upright seed-head. The flower is more irregularly formed and rather more purple than is usual in the *A. elegans* of present-day gardens, yet F. W. BURBIDGE (1847–1905), writing under his pen-name 'VERONICA' in *The Garden* **30,** 449 (November 1886), considered this figure by S. HOLDEN to be a tolerably good representation of the well-known garden plant. One remarkable feature of the plate is the outline of an entire basal leaf which, as mentioned in the accompanying description, is "palmate five-lobed, somewhat heart-shaped at the base; lobes twice serrate." That is to say, it resembles the simple vine-shaped leaf of *A. vitifolia* instead of the trifoliolate, petiolulate leaf of the other parent. The text states that "it was raised in the garden of the Horticultural Society at Chiswick."

Recriprocal crosses were made. Writing editorially about examples of hybridization "in which the history of the mule is known with certainty," LINDLEY stated in the *Gardeners' Chronicle* for July 7, 1855 (p. 451), that "a very valuable variety," with flowers like *Anemone vitifolia* but intermediate in colour, had resulted from *A. vitifolia* (male) × *A. japonica* (female), but the reverse cross, *A. japonica* (male) × *A. vitifolia* (female), had produced "a worthless variety, no longer cultivated" with a ragged flower like *A. japonica*. According to CARRIÈRE in *Revue Horticole*, **31,** 360 (1879), the seedlings varied in the size, colour and even the form of flowers; the colour range of the specimens, presumably dried, sent to him from London, covered white, red and violet-blue, some being entirely of the one colour, others marked at base with a spot or eye of different colour.

Another claim for the raising of *A. hybrida* was made by JAMES CRAIG NIVEN (1828–81) in *The Garden*, **18,** 328 (October 1880). He stated that while at Kew he cultivated the Himalayan *A. vitifolia* side by side with the then newly introduced *A. japonica*, which had just been brought over from China by FORTUNE. This implies after 1844. Seeds were saved from *A. vitifolia* and among the progeny was one with "soft rose-coloured flowers" and perianth-segments "similar in number, but larger as compared with *A. vitifolia* ". NIVEN described the foliage as indicating double parentage, being "sometimes partially divided, sometimes entirely divided, as in the true *A. japonica*." "To this variation I gave the name of *A. japonica* var. *hybrida*, which it unquestionably was."

Thus there can be no doubt that by 1850 a hybrid 'Japanese Anemone' with pink few-tepalled flowers, not unlike those of *A. vitifolia* in general form, had been raised in England by crossing *A. hupehensis japonica* and *A. vitifolia*. The 'Japanese Anemone' most widely cultivated in gardens to-day answers to this description. It is usually known simply as "*A. japonica*," for the true holder of that name has now become rather a scarce plant, but the low fertility of its pollen (about 5 per cent. fertile as compared with about 65 to 100 per cent. fertile in *japonica* and *vitifolia*) * as well as other characters attests its hybrid origin. Unlike *A. vitifolia* it is perfectly hardy. The flower stems may rise to 5 feet, whereas *japonica* is usually well under 3 feet. The pink flowers, about 2½ inches (6 to 7 cm.) across, have seven to eleven perianth-segments, whereas *A. vitifolia* and *A. hupehensis* usually have five and *japonica* has over twenty.

The leaves have usually three long-petiolulate leaflets pilose above and below as in *japonica,* although leaves with a single deeply lobed blade like that of *A. vitifolia* can usually be found by searching a clump (Diagr. 2). The leaflets vary much in size and shape but are often broader and more deeply lobed than those of *japonica.* No such plant has been found among herbarium material of wild origin collected in China. It was unknown in Japan until introduced during the present century from Europe or America. It and a similar white-flowered plant, usually known as *A. japonica alba* or ' Honorine Jobert,' which shows similar leaf-variation (Diagram 2), are among the most valuable of plants for garden ornament from August to October. Being undoubtedly hybrids, it is wrong to describe them as forms of *Anemone japonica.* These ' Japanese Anemones ' can be compared to that " Japanese Garden " in England of which a polite Japanese diplomat exclaimed, " Wonderful, wonderful, we have nothing like this in Japan " ! The correct name for the pink ' Japanese Anemone ' is × *A. elegans.*

JOSEPH DECAISNE (1807–82) described *A. elegans* (Fig. 121) in *Revue Horticole* (ser. 4), **1,** 41, t. 3 (February 1852) as if it were a species, remarking that it was confused in gardens with *A. japonica* and that certain gardeners called it " the hybrid Japanese Anemone." The lower leaves he described as having " in general three leaflets and each leaflet possesses a deeply channelled petiole and an oblique, lobed and toothed blade. This oblique disposition of the blade gives the leaflet a form recalling that of some Begonias, while at the same time their prominent veining, the whitish colour above [*a misprint for* below] and their coriaceous texture like that of *A. vitifolia* separate it from *A. japonica.*" The flowers he described as " 6 cm. in diameter, composed of nine sepals silky on the outside, of beautiful rose or flesh-colour, without violet reflections, of oboval form." The plant here portrayed is the common pink ' Japanese Anemone ' of present-day gardens. There is no uncertainty about the identity of DECAISNE'S plant and the application of the name *A. elegans.*

Although DECAISNE probably considered his *A. elegans* to be a native of Japan, where, as already noted, only the semi-double *A. hupehensis japonica* occurs, he distinguished it as a species because

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* The fertility of the pollen has been ascertained by boiling it for a minute or so with acetocarmine, which stains the nucleus a deeper pink than the rest of the cell. Empty sterile grains are smaller than fertile grains. An alternative reagent, used by HYLANDER, is lactic blue, which imparts a deep blue colour to normal pollen grains. It is of interest to note that a FORREST specimen of *A. hupehensis japonica* (F. 6530) cultivated in Yunnan had 100 per cent. fertile pollen ; a specimen of *japonica* (H. SAKURAI) from Tokyo had 67 per cent. fertile pollen.

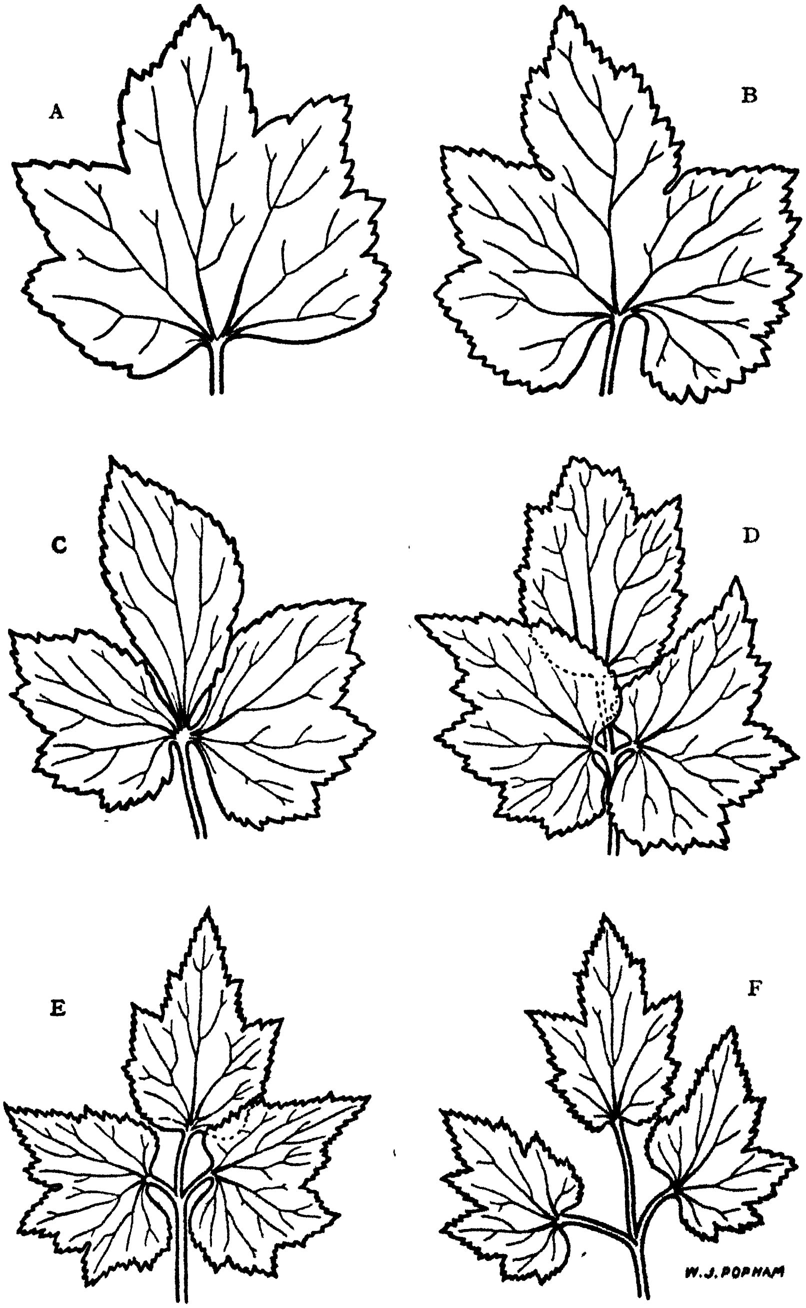

Diagram 2.—Leaf-variation of × *Anemone elegans* 'Honorine Jobert'; A-B, *vitifolia*-like leaves; C-D, intermediate leaves; E-F, *hupehensis*-like leaves; all taken from the same clump.

" the two plants were apt to be confused in gardens, where already one was considered to be the result of a fortuitous hybridization." This indicates that the plant had come into French gardens under the name *A. japonica hybrida.* Confirmation is to be found in the *Bon Jardinier, Almanach pour 1852* (**2,** 228), which states that " gardeners cultivate under the name of *A. japonica hybrid* a species very different [from *A. japonica*] to which we give the name of *speciosa.*" Next year the *Bon Jardinier* replaced this by the statement that " under the name of *A. elegans* is cultivated a species very different [from *A. japonica*] and which is distinguished by the form of the floral divisions " (*Bon. Jard.* **1853,** ii. 889). In VILMORIN-ANDRIEUX, *Fleurs de Pleine Terre,* 73, (1863), the gardener's name *A. hybrida* appears as a synonym of *A. elegans* Decaisne. In DECAISNE and NAUDIN'S *Manuel de l'Amateur des Jardins,* **2,** 318 (1866), the plant is described as " l'anémone élégante (*A. hybrida, A. elegans*)," and illustrated by one of RIOCREUX and LE BLANC'S pleasing and accurate little engravings. Another French author ELIE ABEL CARRIÈRE (1818–96) referred to it as " *Anemone hybrida* or *A. elegans,* plant obtained in England by Mr. GORDON from crossing *A. japonica* with *A. vitifolia* " (*Prod. et Fixation des Variétés,* 43, 1865).

From these statements and from the character of the plant itself, there can be no doubt that the pink ' Japanese Anemone ' so common in gardens to-day originated in the Horticultural Society's Garden at Chiswick about 1847 as a result of the deliberate crossing of *A. hupehensis japonica* and *A. vitifolia* and shortly after its introduction into France was named *A. elegans* by DECAISNE. As the alternative name *A. hybrida* seems not to have been validly published until taken up by MAKINO in 1931 (*Journ. Jap. Bot.,* **7,** 4), *A. elegans* remains the correct name for this hybrid plant.

Apparently unaware of the history of DECAISNE'S *A. elegans,* FRANCHET in 1886 (*Bull. Soc. Bot. France,* **33,** 364), identified with it various specimens collected by DELAVAY on the mountains of Yunnan, western China. He accordingly enumerated these under the name *A. japonica* var. *elegans.* ULBRICH in 1905 (ENGLER, *Bot. Jahrb.* **37,** 253) followed FRANCHET in applying this name to wild Chinese material. The name *A. japonica* (Thunb.) being untenable, HANDEL-MAZZETTI in 1939 (*Acta Horti Gotoburg.,* **13,** 179) adopted the name *A. elegans* for the species commonly called *A. japonica,* within which he included not only the semi-double *A. japonica* (Thunb.) and the single *A. hupehensis* but also *A. tomentosa* (*A. japonica* var. *tomentosa* Maxim., *A. elegans* var. *tomentosa* (Maxim.) H.-M.). He even declared that DECAISNE'S description, figure and statements do not supply the slightest evidence for regarding his *A. elegans* as a hybrid.

Both ADRIEN FRANCHET (1834–1900) and HEINRICH HANDEL-MAZZETTI (1882–1940) were outstanding authorities on the Chinese flora, but they knew plants better in the wild and in herbaria than in gardens. An independent survey of the evidence supports HYLANDER'S opinion that " HANDEL-MAZZETTI'S conception of *A. elegans* is entirely erroneous, while the identification of the latter as *nipponica* [i.e. *A.*

hupehensis japonica] × *vitifolia* is correct." The name *A. elegans* cannot legitimately be used for the wild Chinese plants placed under it by HANDEL-MAZZETTI.

The hybrid origin of × *A. elegans* accounts for both its vigour and the remarkable diversity of the plants derived from it. These vary in colour from pure white to deep rose and present many combinations of features characteristic of *A. hupehensis japonica* and *A. vitifolia.* The most important is the pure white ' Honorine Jobert ' or *A. japonica alba,* as it is sometimes called (Fig. 119, no. 1), which has been a popular garden plant for three quarters of a century. It is the white counterpart of the pink × *A. elegans.* There can be only one opinion as to its beauty and value. " Of all Autumn flowers there is none more beautiful than the white Japanese Anemone," wrote Canon HENRY N. ELLACOMBE in 1896, " indeed I think there is no more beautiful hardy flower and none more useful.'

Three divergent views have been put forward regarding the origin of ' Honorine Jobert.' Two agree that it appeared accidentally as a sport in a garden at Verdun, but differ with regard to the plant on which the white-flowered plant was found. Thus FROEBEL and VILMORIN-ANDRIEUX stated that it arose from the red semi-double *A. japonica,* while CARRIÈRE, ALEXANDER DEAN and EMILE LEMOINE believed it to be from × *A. elegans.* The third view was expressed by J. C. NIVEN in *The Garden,* **18,** 328 (1880), when he wrote, " it is said that *A.* ' Honorine Jobert ' is only a white-flowered sport from the hybrid, but I have a strong suspicion that it is really a seedling from it." As he brings forward no evidence, this view can be dismissed.

According to OTTO FROEBEL of Zürich, writing in the *Gardeners' Chronicle,* new ser., **2,** 657 (November 21, 1874), " *Anemone* ' Honorine Jobert ' originated at Verdun-sur-Meuse about sixteen years ago [i.e. about 1857 or 1858], in the garden of Mr. JOBERT, banker. From there the plant came into our hands in 1860, through my grand-uncle, Mr. GUSTAV MEMMINGER of Verdun, a great amateur of plants, after whom the *Aesculus Memmingeri* [= *Ae. Hippocastanum Memmingeri*] is named. Mr. JOBERT, his friend, obtained the *Anemone* ' Honorine Jobert ' from a large tuft of the old *A. japonica* [i.e. *A. hupehensis japonica*], with red flowers, from which plant a root branch flowered with pure white flowers. Mr. JOBERT successively cut down all the red flowering branches, and so raised the white variety. Our nursery was the first to introduce the plant to commerce under the original name given by Mr. JOBERT, *A. japonica* ' Honorine Jobert.' I have often seen at Mr. JOBERT's the original plant from which the white variety was fixed, and therefore I guarantee the exactness of my assertion." The question arises, however, as to whether it really was FORTUNE's old semi-double red-flowered form which produced the pure white mostly nine-tepalled ' Honorine Jobert.' M. JOBERT's drastic treatment of successively cutting down the parent plant whenever it showed flowers other than white seems likely to have resulted in its disappearance. " The original plant from which the white variety was fixed," so often seen by FROEBEL, probably refers to the original plant of the white sport. It is, however, clear from this account that 'Honorine Jobert' originated at Verdun about 1857 or 1858 as a bud-sport and passed into trade hands in 1860.

Five years later a French gardener-botanist ELIE ABEL CARRIÈRE (1818-96) in his *Production et Fixation des Variétés* (Paris, 1865), wrote that *Anemone* 'Honorine Jobert' "a vigorous and very beautiful variety, of which the flower is white, is an 'accident' [sport] of *Anemone hybrida* or *A. elegans*, a plant obtained in England by GORDON from crossing *A. japonica* with *A. vitifolia*. This 'accident' [sport] Anemone 'Honorine Jobert' appeared some years ago in the garden of an amateur, M. JOBERT, at Verdun." In 1867 (*Revue Horticole*, **39**, 12), CARRIÈRE again stated that this plant arose at Verdun on a root of *A. japonica elegans* which some considered a hybrid. In 1879 (*Revue Horticole*, **51**, 359), he repeated his statements, being positive as to their veracity, and emphasized the hybrid origin of the plant, *A. elegans*, on which it had arisen.

CARRIÈRE wrote within ten years of the appearance of *Anemone* 'Honorine Jobert.' He was a painstaking scientific horticulturist especially interested in the variation of plants. His testimony that 'Honorine Jobert' arose from the pink × *A. elegans* and not from *A. hupehensis japonica* is likely to have been based on authentic information and it accords with the character of the plant. It was confirmed by EMILE LEMOINE (1862–1942), writing in *The Garden*, **47,** 211 (March 1895). He described first how *A. elegans* differs from the old semi-double *A. japonica* of FORTUNE by "its more ample foliage, its broader leaflets, its stouter, taller, and more numerous stems, and, lastly, by the form and colour of its flowers [which] are of larger size and have from 5 to 9 broad, rounded petals of a handsome, perfectly uniform light pinkish-lilac colour." He then related how "this fine plant very soon became widely cultivated, and amongst others, M. JOBERT, a banker at Verdun (Meuse), was supplied with it from the establishment of Messrs. THIBAUT and KETELEER, which was then located at Paris. In M. JOBERT's garden one of these plants of *A. japonica elegans* happened to "sport," a shoot of it producing perfectly white flowers. When this variety was fixed, four nurserymen received each a plant of it at the same time, and one of these nurserymen, M. VICTOR LEMOINE [1823–1911], of Nancy, was the first to send it out in the early part of the year 1863. Such was the origin of *A. japonica alba*, which is also known as *A. japonica* 'Honorine Jobert,' and which, with the exception of its white flowers, is identical in every respect with *A. japonica elegans*." This account being written by the son of VICTOR LEMOINE himself, and agreeing with other evidence, can be regarded as completely trustworthy.

It is supported by an example of similar variation recorded by ALEXANDER DEAN in *The Garden*, **18,** 421 (Oct. 1880), where he wrote, "I have found that since last Autumn plants of *rosea* have sported to *alba* and are now producing white flowers. . . . I think it points to the conclusion that the white is produced by a sport from the pink." Another example is furnished by CARRIÈRE in *Revue Horticole*, **42–43,** 563 (1871), one of whose friends planted in 1869 a piece of *A. elegans* which produced rose flowers in 1870 but sported white flowers in 1871. An illustration of the pink *elegans* growing on the same rootstock as the white 'Honorine Jobert' which occurred at Verrières was published by Carrière in *Revue Horticole*, **51**, 359, Fig. 76 (1879). There is nothing improbable in this conclusion that the white 'Honorine Jobert' arose as a vegetative sport on the pink × *A. elegans*. Somatic variations or bud-sports[*] ("those sudden changes in structure or appearance which occasionally occur in full-grown plants in their flower-buds or leaf-buds," as Charles Darwin called them), are known among many cultivated plants of mixed (heterozygous) origin, i.e., derived from the crossing of different species or of varieties within the one species. Amphichromy, as the bearing of flowers of different colour on branches of the same stock is called, also occurs among wild plants. Thus a bush of purple-flowered Heather (*Calluna vulgaris*) has been found bearing a white-flowered shoot and Darwin noted the occurrence of a tuft of pure white blossoms on a dark pink Hawthorn (*Crataegus*). Numerous instances of somatic variation have occurred in *Bouvardia, Rosa, Chrysanthemum* and *Pelargonium*. On investigation many plants showing bud-variation have proved to be periclinal chimaeras, i.e. of composite structure, with skin and core genetically unlike, the one overlaying the other "just as a glove covers a hand." A bud arising from the outer tissue produces a member different from one derived from the inner tissue. By analogy with such plants it appears likely that × *Anemone elegans* is also a periclinal chimaera with tissue for whiteness (presumably recessive) overlaying tissue for redness.

Messrs. Froebel and Messrs. Lemoine soon put *Anemone* 'Honorine Jobert' on to the market. It was first exhibited in England by Messrs. F. & A. Smith of Dulwich in September 1863, and by Messrs. E. G. Henderson & Son in October 1863; the Royal Horticultural Society promptly awarded it a Commendation and Special Certificate as a good late-blooming hardy border plant.

Although × *A. elegans* was thus raised by 1848 and the pure white sport 'Honorine Jobert' appeared about 1858, these two are still the most widely known 'Japanese Anemones.' They and the original *A. hupehensis japonica* were the only kinds available until 1887 when Messrs. James Vick of Rochester, N.Y., U.S.A., introduced 'Whirlwind' ('Wirbelwind' of German nurseries), a form of unknown origin with numerous white perianth-segments; it is figured in *Revue Horticole*, **73**, facing p. 380 (1901). 'Lady Ardilaun' raised by A. Campbell, head gardener to Lord and Lady Ardilaun at Ashford, Cong, Co. Galway, was put into commerce in 1890. In *The Garden*, **42**, 356 (Oct. 1892), Campbell stated "six years ago I observed a head of seed on a plant of *Anemone japonica alba*. . . . This I sowed when ripe and got three seedlings from it. One of these I found much finer than the other two. From this plant the stock has been raised." Using 'Lady Ardilaun' as a parent, Messrs. LEMOINE obtained a series of seedlings exhibiting "the greatest diversity of variation in habit, size of flower, doubleness and also in colouring." Of these, the white 'Beauté Parfaite' and rose 'Rosea superba' were put on the market by LEMOINE in 1894, the white 'Coupe d'Argent' in 1895, the white 'Collerette' and white 'Vase d'Argent' in 1897, the pink 'Profusion' in 1898, the pink 'Mont Rose' in 1899, the pink 'Elegantissima' in 1900. Other raisers then took up the group and now the number of named "Japanese Anemones" exceeds thirty. The white-flowered forms also include 'Bühler Kind' of Uhink, 'Géante des Blanches.' 'Luise Uhink' of Uhink, 'Renoncule' and 'Schneekönigin' (Snow Queen) of Pfitzer. Rose-tinged, pink and red-flowered forms include 'Alice,' 'Auréole,' 'Autumn Queen,' 'Brilliant' (possibly typical *A. hupehensis japonica*), 'Calice Rose,' 'Charmeuse,' 'Couronnement,' 'Diadème,' 'Enchantement,' 'Enchantress,' 'Gracieuse,' 'Herzblut,' 'Joconde,' 'Königen Charlotte' ('Queen Charlotte'), 'Krimhilde,' 'Le Nain Rose,' 'Lorelei,' 'Magenta,' 'Margarete,' 'Max Vogel,' 'Mignon,' 'Mont Rose,' 'Nebuleuse,' 'Prinz Heinrich,' 'Purpurine,' 'Rikhard Ahrens,' 'Rosace,' 'Rose d'Automne,' 'Stuttgardia,' and 'Turban.' Although many of these were raised by VICTOR LEMOINE and EMILE LEMOINE, others are due to the work of GOOS and KOENEMANN, KOLL and SONNTAG, L. LINDNER and WILHELM PFITZER. For a list of LEMOINE'S introductions up to 1905, see JULES RUDOLPH in *Revue Horticole*, 77, 542 (1905). A coloured plate by WALTER MÜLLER in F. W. MEYER, *The Best Hardy Perennials*, t. 2 (1901), shows some of the variants available by 1900 (Fig. 119).

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[*] For a detailed account of bud-variations, see P. J. S. Cramer (1907), *Kritische Übersicht der bekannten Fälle von Knospenvariation*, 474 pages (*Natuurk. Verh. Hollandsch. Maatsch. Wet. Haarlem* (3) **6**, no. 3): the same subject is discussed by Reginald J. Chittenden (1927), "Vegetative Segregation" in *Bibliographica Genetica* (The Hague) **8**, 355–442, and M. B. Crane and W. J. C. Lawrence (1938), *Genetics of Garden Plants*, 2nd ed. 168–181.

These hybrids should be grouped under *A. elegans* (*A. hupehensis* var. *japonica* × *A. vitifolia*), not under *A. japonica* as hitherto. They are mostly robust and hardy plants, of high value for garden ornament from August to October. Any good soil and almost any position suits them, but once planted they should be left well alone as they resent disturbance and are slow to re-establish themselves. Small suckers generally settle down better than old plants with hard woody roots. They are best moved in Spring and they usually take two seasons to make strong flowering plants. Root cuttings offer the best means of propagation.

SUMMARY

Most of the plants grown under the name *Anemone japonica* have no right to that title. For the wild species (Fig. 113) widespread in China the name *A. hupehensis* Lemoine (1910) should be adopted; it was first introduced about 1902–06, probably by SILVESTRI. A semi-double form (Figs. 112, 120,) of this, cultivated by the Chinese in Yunnan and Kiangsu, was long ago introduced into Japan and is the historic *A. japonica* (Thunb.) Sieb et Zucc. (1835), non Houttyn (1778); for this the name **A. hupehensis var. japonica** (Thunb.) Bowles et Stearn, syn. *A. nipponica* Merrill (1938) is proposed. Fortune introduced this in 1844 from Shanghai. Hybridized by GORDON about 1847 with

A. vitifolia (Fig. 117) it produced × *A. elegans* (Fig. 121), the common pink " Japanese Anemone " of present-day gardens. This appears to be a periclinal chimaera and about 1858 produced at Verdun a white-flowered bud-sport, × *A. elegans* 'Honorine Jobert,' the common white " Japanese Anemone." A seedling from this, 'Lady Ardilaun,' was raised in Ireland about 1887. Used by Messrs. LEMOINE as a parent it gave rise to a series of very diverse forms (cf. Fig. 119) of which over thirty have been named. The " Japanese Anemones " of present-day gardens are thus of hybrid origin and should accordingly be grouped under × *A. elegans* and not under *A. japonica*,

The following is a key to the most important wild and cultivated members of the group formerly known as *Anemone japonica* :—

1a. Leaves always entire, never divided into 3 leaflets ; blade deeply lobed, vine-like (cf. Diagr. 1, A–C). Flowers always white inside ; tepals mostly 5. Plant rather tender. North India (Himalaya), Upper Burma, Western China (Yunnan only) *A. vitifolia* Buchanan-Hamilton

1b. Leaves with 3 leaflets, except on innovation shoots (cf. Diagr. 1, D, Diagr. 2). Plant perfectly hardy 2

2a. Leaves entirely covered beneath with a close whitish tomentum of entangled hairs. Tepals 5 or 6, pale rose. North China (Kansu, Szechwan, Shensi, Chihli, Hupeh) *A. tomentosa* (Maxim.) P'ei

2b. Leaves sparsely hairy beneath, the hairs not completely covering the surface 3

3a. Tepals few (5 or 6), almost orbicular. Plant mostly under 2 ft. (60 cm.) high. Pollen fertile (c. 68–95 per cent.). Central China (Hupeh, Hunan, Szechwan, Kweichow, Kwangsi, Yunnan) . . . . *A. hupehensis* Lemoine

3b. Tepals more numerous 4

4a. Tepals very numerous, usually more than 20, rather narrow, carmine-rose. Plant mostly under 2 ft. (60 cm.) high. Pollen fertile (c. 67–100 per cent.). Japan (naturalized) ; Southern China (naturalized ?) *A. hupehensis* var. *japonica* (Thunb.) Bowles et Stearn

4b. Tepals less numerous, 6–20. Plant up to 5 ft. (150 cm.) high. Pollen mostly sterile (0–30 per cent. fertile). Garden origin . 5

5a. Tepals 6–11, mostly 7–9. Commonly cultivated plants . . 6

5b. Tepals often more than 9 . . . × *A. elegans* forms

6a. Tepals pink . . . . . × *A. elegans* Decaisne

6b. Tepals white . . . × *A. elegans* clon 'Honorine Jobert'

In conclusion we wish to thank the authorities at the British Museum (Natural History), the Royal Botanic Garden, Edinburgh, and the Royal Botanic Garden, Kew, for opportunities to study the material in their charge, Professor J. A. NANNFELDT, Uppsala, for an excellent photograph of the type-specimen of *Atragene japonica* Thunb., and Dr. E. K. JANAKI AMMAL, Wisley, for examining the pollen fertility of numerous specimens.

MECONOPSIS FROM THE VICINITY OF LHASA

By George Taylor, D.Sc.

THE impact of the recent war brought repercussions in remote regions, and, as Tibet did not escape its influence, the duties which occasioned the presence of two well-known botanical and ornithological collectors, F. LUDLOW and G. SHERRIFF, in Lhasa may be considered one of its happier consequences. LUDLOW went to Lhasa in charge of the British Mission in May 1942, and after about a year's stay was relieved by SHERRIFF. Throughout their consecutive tours, covering a period of about three years, they accumulated over 1,200 gatherings of plants, fully referenced with field notes, and, in addition to these important collections, sent home several consignments of seeds. In spite of their arduous official duties and the difficulties of travel beyond the immediate bounds of Lhasa, not only did they collect in the neighbourhood of the city, but extended their field work in different directions even to a distance of some seventy miles to the north-west of the city.

Though many collections have been made along the Tibet-Sikkim frontier and on the route to Lhasa as far as Gyantse, the flora beyond that town and particularly north of the Tsangpo was imperfectly known. Representation of the vegetation around Lhasa in the National Collections of the British Museum has hitherto been very incomplete, as specimens of earlier collectors are generally rather scrappy, poorly annotated and in many cases vaguely localized. The splendid series of plants obtained by LUDLOW and SHERRIFF is almost certainly the most comprehensive yet made in this little-known area by experienced botanists and forms a very valuable addition to the extensive Tibetan collections in the Museum.

The first specimens to reach this country from Lhasa were collected by members of the 1904 Younghusband Expedition, and the only published botanical results of this expedition is the systematic list of identifications made by PRAIN which appeared as an appendix to the third edition of L. A. WADDELL'S *Lhasa and its Mysteries* (1906). The collections attributed to H. J. WALTON, containing many species not found by WADDELL, have not been enumerated. The plants from this expedition are preserved at the Royal Botanic Gardens, Kew, though duplicates have been distributed to other institutions.

In 1935 C. S. VERNAY and A. S. CUTTING visited Lhasa, and during their brief stay of two months they made a small collection of plants which included several novelties (see *Bull. Misc. Inf. Kew* 1937, 94 (1937)).

During the autumn and winter months of late August 1935 to mid-February 1936, F. SPENCER CHAPMAN accompanied a Mission to Lhasa, and the notable results of his botanizing on the journey and at Lhasa are published in an appendix to his *Lhasa : the holy city* (1938). His specimens are preserved at Kew.

In 1939 the British Resident in Lhasa, H. E. RICHARDSON, collected about 400 specimens of plants during the months April to November, and these were presented to the British Museum.

These appear to be the only considerable collections made around Lhasa, and I have mentioned all publications dealing with the vegetation of the region which have come to my notice.

The primary purpose of this note is to record recent interesting discoveries of *Meconopsis* from the Lhasa area. Two species, M. HORRIDULA Hook. & Thoms. and M. TORQUATA Prain, have been recorded. The former is the most widespread species of the genus and, in a variety of forms, ranges from western Kansu to north-western Yunnan, through south-east Tibet and Upper Burma and along the Himalaya to central Nepal. On the passes of the plateau of S.E. Tibet, *M. horridula* is common, and at the highest altitudes and in exposed situations it tends to become much reduced in stature, to have the flowers borne on basal scapes and to bristle with straw-coloured spines. A form collected by LUDLOW and SHERRIFF at Reting, about 60 miles north of Lhasa, has leaves which are occasionally deeply pinnatifid and the flowers are described as reddish-blue and mauve-red.

M. torquata is a rare species with a very limited distribution, and according to WALTON'S field notes it was discovered in the Kyi-chu Valley, fifteen miles east of Lhasa, in September 1904, during the Younghusband Expedition, but only the single specimen on which PRAIN based his description was preserved. The repeated failure of later collectors to locate the Poppy in its original locality added an elusiveness to the plant quite in keeping with the mysterious city near which it was reputed to grow; but when LUDLOW told me that he was going to Lhasa I knew that he would spare no effort to trace *M. torquata* and that he would do his utmost to introduce the plant into cultivation in this country.

On July 1, 1942, LUDLOW reported that he had rediscovered *M. torquata* on boulder scree at 15,000 feet, about ten miles north of Lhasa. His remarks are of interest: "it will not suffer by comparison with any other member of this lovely genus, but I fear that it will always be the despair of horticulturists. In colour it is a very perfect blue, not so pale as 'bella' nor so dark as 'grandis.' And I never saw a plant that was not 'true blue.' If I have any adverse criticism to make, it is that the blooms are too closely jammed together. But 'torquata,' in spite of its closely adpressed blooms, is a thing of great beauty." This description, from a discriminating observer who has unrivalled first-hand knowledge of *Meconopsis* in the field, indicates the high merits of *M. torquata.* LUDLOW, and also SHERRIFF later, remarked on the number of non-flowering plants of various ages which were noticed, and there is little doubt, judging from the elongated scarred root-stock and persistent leaf bases, that the species normally requires some years of growth before reaching maturity. The basal rosettes are, however, not unattractive, and in winter the tight golden-haired resting bud is very beautiful.

LUDLOW and SHERRIFF made five separate collections of *M. torquata* to the west and north of Lhasa *; they were unable to detect the species in its original recorded locality, fifteen miles east of Lhasa at an altitude of 11,500 feet. Lhasa lies at 11,500 feet and the country rises to the east, so possibly there may have been some error both in Walton's localization of the specimen and in the description of the flower colour as pale red. It is not unlikely that Walton relied on native collectors in making his field notes and the colour description of *M. torquata* may have become mixed with that of *M. horridula*, large numbers of which are reddish in the vicinity of Lhasa, while *M. torquata* is constantly sky-blue.

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* The field notes of the specimens in the British Museum (Natural History) are as follows: hills north of Lhasa, 8–10 miles up valley to west of Sera Monas-

All the flowers which I have examined have four petals which are unique in the genus in having barbellate bristles on the back. It is in the structure of the gynœcium, however, that *M. torquata* is of exceptional interest, with the bristly tomentose ovary surmounted by a glabrous disc which is at first more or less flat with small sinuations projecting over the inter-placental areas. In fruit the disc is accrescent and becomes rigid, woody and suberect to form a fluted coping with the grooves directly above the dehiscent capsule valves and the ridges (each about halfway furnished with a small downward projecting process) overhanging the placental ribs.

In September 1942 Ludlow sent home a large consignment of seed which was widely distributed. Further samples were sent at intervals by Ludlow and Sherriff until late 1943, but Ludlow's misgivings have unfortunately been justified. Good germination was reported from several gardens, but it was soon obvious that to rear the species was a severe test. The young plants never seemed to make much headway, and stocks gradually dwindled, though I know of a few survivors which may yet come to flower.

Though the plant may take some years to reach maturity, it is monocarpic. The dense rosettes with their fawn-coloured pubescence are very attractive, but it is in the flowering stage that the plant reveals its high merit. No other *Meconopsis* produces flowers in such a congested inflorescence in which the topmost flower opens first and there is a gradual succession down the flowering stem. The species, too, does not appear to be so evanescent as its relatives, and the petals usually persist long after the plant has fruited, a most unusual feature in a Poppy.

It is clear from the coloured plate (Fig. 116), reproduced from a photograph taken by Sherriff at Nangtse, that *M. torquata* is a

tery on left side of road ; in boulder scree, 15,000–16,000 feet ; plant 1–1½ feet high ; flowers large, sky-blue, densely aggregated, handsome ; anthers yellow, filaments blue ; base of stem much swollen and containing much watery fluid ; 30 June 1942 ; *Ludlow & Sherriff* 8777. Hills west of Lhasa beyond Trisum ; in boulder scree, 15,500 feet ; flowers over ; 1 Sept. 1942 ; *L. & S.* 9059. Hills north of Lhasa ; in boulder scree, 14,500 feet ; flowers not yet open ; 25 June 1943 ; *L. & S.* 9721. Hills north of Lhasa ; on north face in boulder scree, many in complete shade, some in open situations ; 14,500–15,500 feet ; flowers bright sky-blue ; hairs on petals pale fawn ; hairs on leaves, etc., fawn ; a mat of old leaves at base of plant ; stems hollow but a solid portion at neck which contains a clear syrup-like fluid ; 12 July 1943 ; *L & S.* 9797. Much more common from 14,000 to 16,000 feet at head of valley north of Nangtse, 20 miles west of Lhasa, as many as 10–15 seen together in flower ; no specimen taken ; *L. & S.* 9797a. Same locality, in boulder scree, 15,000 feet ; flowers over, seed collected ; 5 October 1943 ; *L. & S.* 9957. Hills north of Lhasa, on boulder screes 15,500 feet ; fruiting specimen ; 26 August 1943 ; *L. & S.* 9904.

striking and most desirable garden plant though it probably demands conditions too exacting for its successful acclimatization. In its natural habitat (Fig. 122), always in boulder scree where sometimes it is completely overhung by rocks, the plant withstands a climate of great severity with an extremely dry winter (the rainfall of Lhasa is only 16 to 20 inches a year, though a little higher in the neighbouring mountains) and temperatures remaining below zero Fahrenheit for weeks on end. It is not accustomed to the snow blanket which covers so many " difficult " species from the Himalaya.

By their discovery of *M. integrifolia* (Maxim.) Franch. near Lhasa, LUDLOW and SHERRIFF added an interesting record to the flora of the region and further extended the already wide range of the species. Judging from available records, the greatest concentration of *M. integrifolia* is in north-western Yunnan, whence it extends northwards through Szechuan to Kansu and north-eastern Tibet and southwards to Upper Burma. Its presence in south-east Tibet was reported by KINGDON-WARD in 1924, when he collected the species on the Temo La, a notable extension of the known range. Eleven years later he found the species about 120 miles west of the Temo La, on the Ashang Kang La, and this remained the western known limit until LUDLOW and SHERRIFF discovered the plant in three different localities around Lhasa. At Ganden, 25 miles north of Lhasa, it was found in boulder scree at 15,500 feet and seed was collected and distributed under *Ludlow and Sherriff* 9945. Three separate collections were made at Reting, some 60 miles north of Lhasa, where the plant is abundant near streams at 14,000–15,000 feet and grows up to five feet in height. On the Nyenchentang La, the great range of mountains with peaks over 20,000 feet in height which delimits the Tsangpo drainage system on the north from the Chang Tang plateau, *M. integrifolia* was found at 14,000 feet about 70 miles from Lhasa and this station is the extreme western known limit of the species (Fig. 123). All the specimens obtained by LUDLOW and SHERRIFF are of the long-styled form.

Lhasa lies on the outer plateau in the transitional vegetation zone. The inhospitable Chang Tang desert, with a climate of extreme rigour, lies to the north-west beyond the Nyenchentang Mountains; to the south gravelly plateau stretches to the Himalaya; to the north-east and east pleasant, undulating, grassy plateau extends to the borders of south-western China, where it merges into the great river gorge country with a high rainfall and with an exceptionally rich alpine flora. From this prolific region several species apparently have migrated over the plateau to the neighbourhood of Lhasa, and *M. integrifolia* is only one example of this westward penetration. Two Primulas in the LUDLOW and SHERRIFF collection, *P. rigida* and *P. secundiflora*, have their main concentration in Yunnan and Szechuan, and their discovery near Lhasa is a very notable extension of their geographical range, as they have not been definitely reported from the intervening area. It is interesting to note that the migrational impetus of these species, as probably of others yet unidentified, has not carried them over the Tsangpo or to the main Himalaya.

MASTERS MEMORIAL LECTURES, 1947

GROWTH REGULATING SUBSTANCES IN HORTICULTURE

By Thomas Swarbrick, M.Sc. Ph.D.

PART I

(DR. J. RAMSBOTTOM, O.B.E., D.SC., F.L.S., *in the Chair*)

HOW often do we take things for granted! The shape, form and development of plants and animals is just one of the many things of nature which we take for granted. When we sow Radish or Tomato seed we know from past experience how these seeds will germinate and we can describe in detail their growth, subsequent flowering and seed production. But if we are presented with the seed of a plant which we have never seen, there is no means of foretelling the shape, size or flower form of the plant that will ultimately develop. Indeed, most of us would find it very difficult if not impossible, to sort out Radish seed into the round French breakfast and the long red varieties, yet we have to admit that all the characters of the plant are inherent in the protoplasm that makes up the seed. At first sight it would appear that in nature everything is pre-determined, but as we shall see later it is possible by means of X-rays and the use of chemicals to break into this predetermined system and to change its subsequent course of development.

This is all very disturbing for the taxonomist who works out elaborate systems of classification on what appears to be a fixed law of nature. We are all familiar with the fact that certain species of plants have alternate and opposite leaves, others have their leaves in whorls and others in spirals. It is this constancy which enables us to practise commercial horticulture, for without it everything would be as the Bible says it was once, " without form and void." But this constancy is only relative. Nature is in the main constant and dependable and this is the most usual impression we have of it. But nothing is really constant. Everything is in a state of flux, and new forms are always in the process of becoming. Nobody knows what potentiality lies hidden in living matter. The past is strewn with the forms that failed to survive, but the present forms must in some way provide for those of the future.

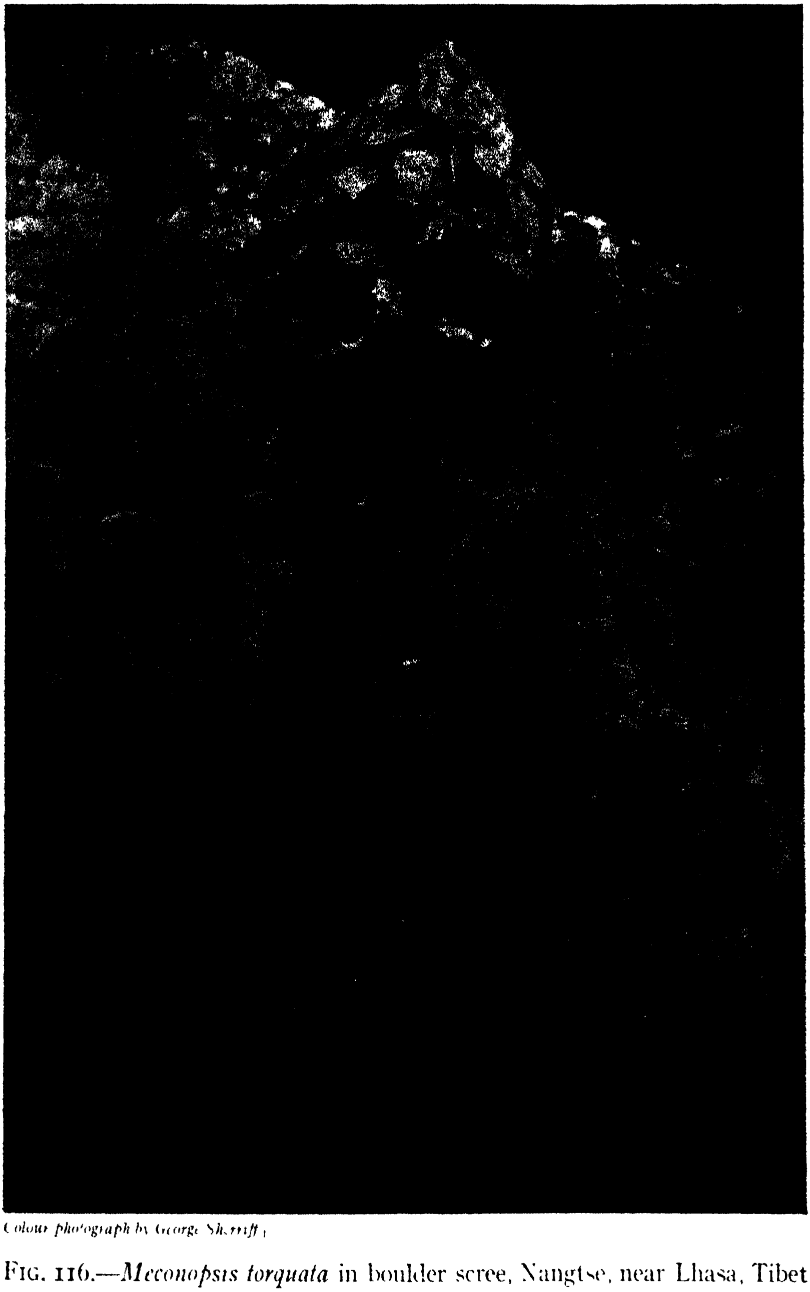
Since we are about to discuss growth regulating substances it is necessary that we should have a common understanding of what we mean by growth. The most usual criterion of growth is increase in size. But while it is generally true that an organ which is growing will at the same time be increasing in size, it is never safe to assume that because an organ is increasing in size it is therefore growing—

unless of course you define growth as increase in size. Plant cells and, therefore, the organs derived from them, may increase in size exactly in the same way as a football when it is inflated with air—except that the plant cell becomes " inflated " with water. Every cherry grower is familiar with this phenomenon and suffers material loss from an undesirable increase in the size of his cherries just prior to harvest. The cherries absorb water from the rain, swell and burst. But this is not growth, it is merely increase in size. What then is growth and how can we recognize it ?

The individual cell is the unit basis of living matter. But although it is so small, it is by no means simple in structure or organization. Since it is our purpose to discuss the effect of certain chemicals upon the living cell, it is necessary to describe its organization in outline. The normal plant cell consists of an outer retaining wall which is made up like a sandwich of a middle lamella of pectinaceous material on to which are deposited orientated layers of that most common of all plant substances, cellulose. It is important to realize that the cell wall has " structure " just as a brick wall has structure, because certain substances have profound effects upon the elasticity or rigidity of this wall, effects which are associated with bending and plant responses generally.

The cell wall encloses and retains the cell contents. These comprise a complicated system of fats, proteins and electrolytes, some in aqueous solution, some as emulsions, some as colloidal sols and gels. Embedded in, and enveloped by, this matrix are such recognisable entities as the nucleus and chloroplasts. The nucleus itself has a highly complex structure and undergoes a definite cycle of changes which result in a division of all the components into two equal halves, yet it never loses its identity. In fact, the nucleus is the most important part of the cell particularly during its early life, because the nucleus controls or dominates the small world of living matter enclosed by the cell wall. It is essential to realize, therefore, that in every living cell nature has provided a local commander in the field whose job it is to maintain *status quo.* This is the physical basis of the constancy we so often see in nature. Changes in form or function that may appear from time to time are the result of a weakening of nuclear control due to increasing age of the cell, or to the imposition of more powerful influences or stimuli from outside. It is part of this study to describe the chemicals that can be used to change either the form or function of a plant cell, but it must in fairness be pointed out that other influences such as X-rays may also change the course of normal development.

Growth as the physiologist understands it, may therefore be described as an increase in cell number by a process of cell-division, whereby each daughter cell gets a half of all the cell contents, thereby becoming identical with the parent so far as content and potential development are concerned. This increase in cell number may, or may not, be accompanied by an overall increase in size. A cell may divide into two and these may divide again into two without any increase in overall size, since the daughter cells may remain one half



(Colour photograph by George Sherriff)

FIG. 116.—*Meconopsis torquata* in boulder scree, Nangtse, near Lhasa, Tibet
(See p. 311)

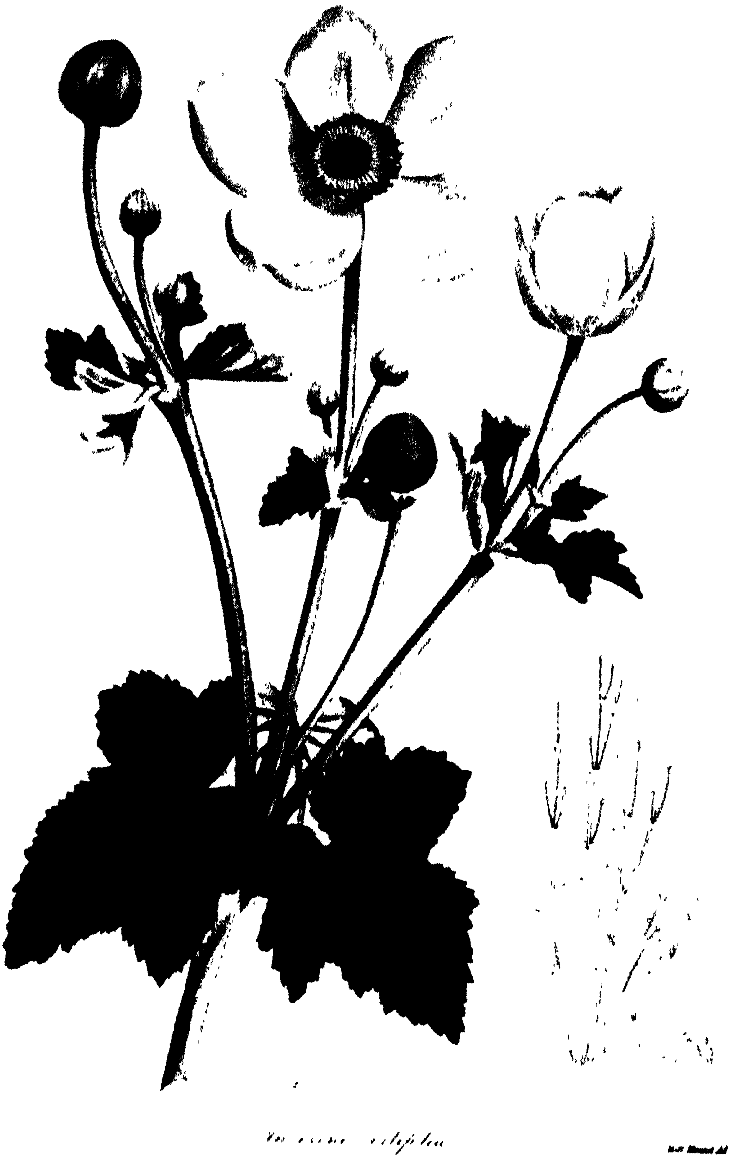


FIG. 117.—*Anemone vitifolia* [from Maund & Henslow, "Botanist," **1**, t. 9; 1837]
(See p. 298)

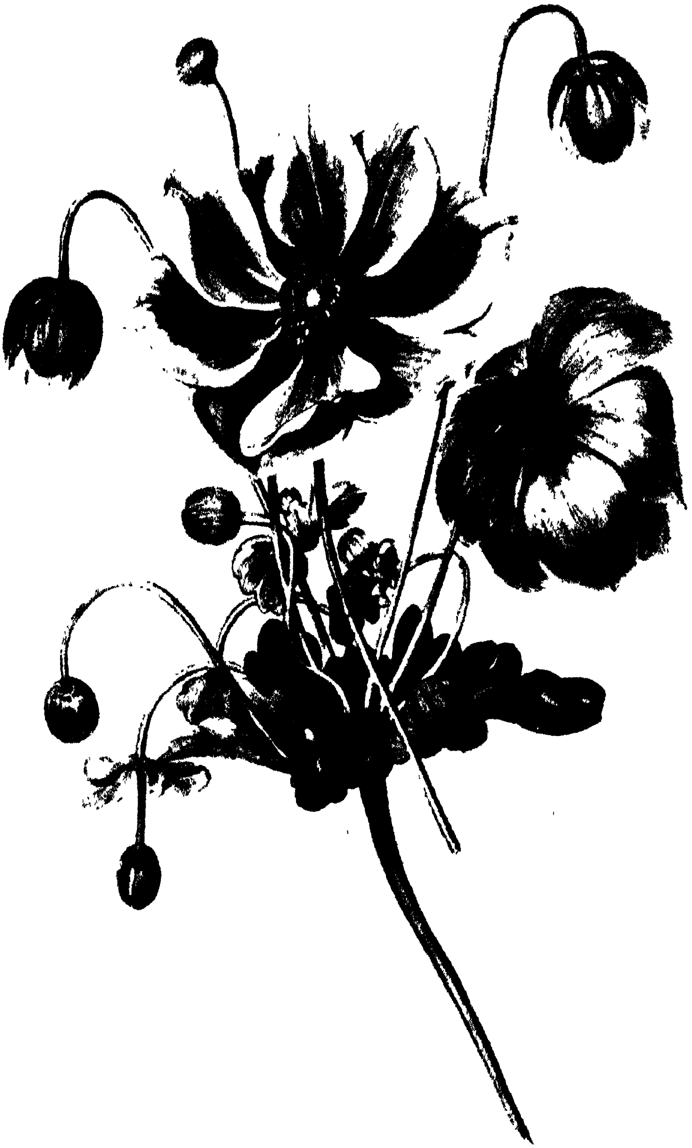


FIG. 118. × *Anemone elegans* var. from Moore & Ayres, "Gardeners' Magazine of Botany," **1,** (1850) as *A. japonica* var. *hybrida.* (See p. 300)

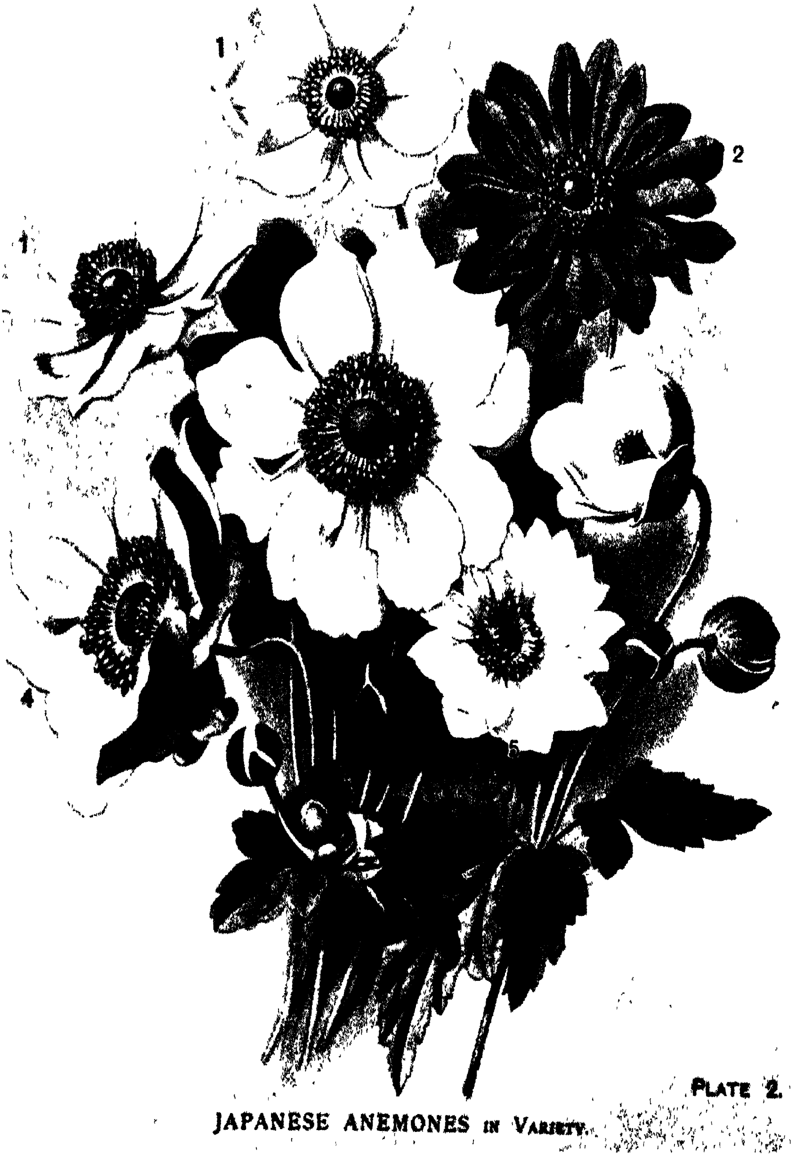


FIG. 119.—× *Anemone elegans* vars.: 1, 'Honorine Jobert'; 2, 'Brilliant' (possibly *A. hupehensis japonica*); 3, *elegans*; 4, 'Queen Charlotte'; 5, 'Whirlwind' [By Walter Müller from F. W. Meyer, "The Best Hardy Perennials," t. 2; 1901.] (See p. 307)

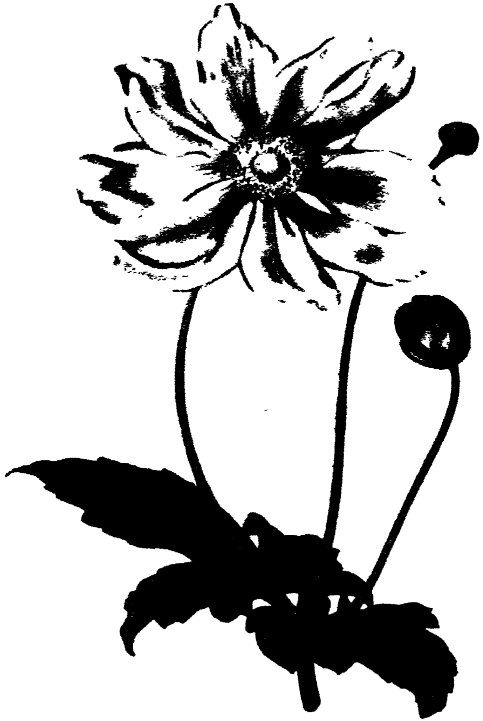


FIG. 120.—*Anemone hupehensis* var. *japonica* [from "Revue Horticole" (ser. 4). **1,** t. 6

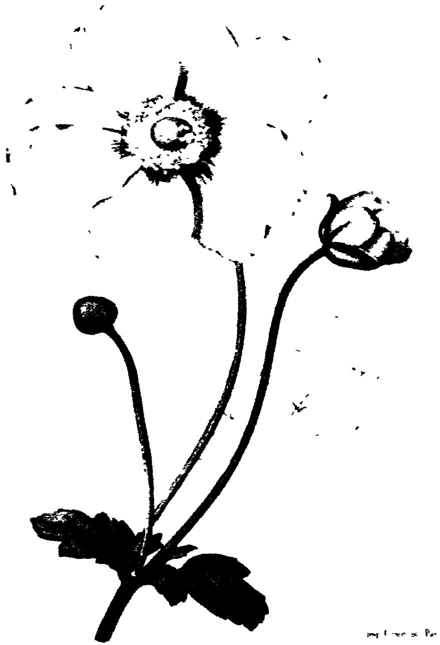
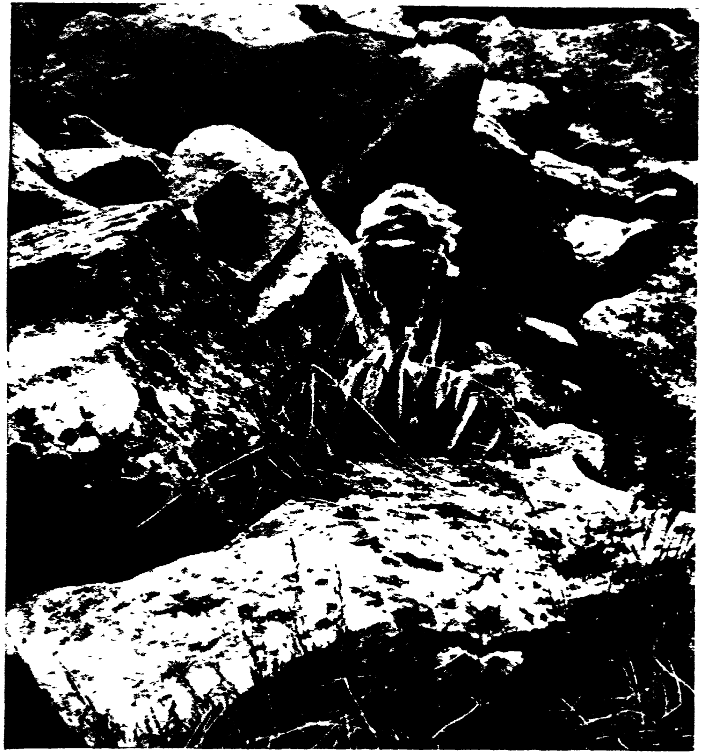


FIG. 121 *Anemone elegans* from "Revue Horticole" (ser. 4) **1,** t. 3, 1852 (See p. 301)



Photos, George Sherriff

FIG. 122.—*Meconopsis torquata* with *Paraquilegia* on left and *Meconopsis horridula* in foreground near Lhasa (See p 312)

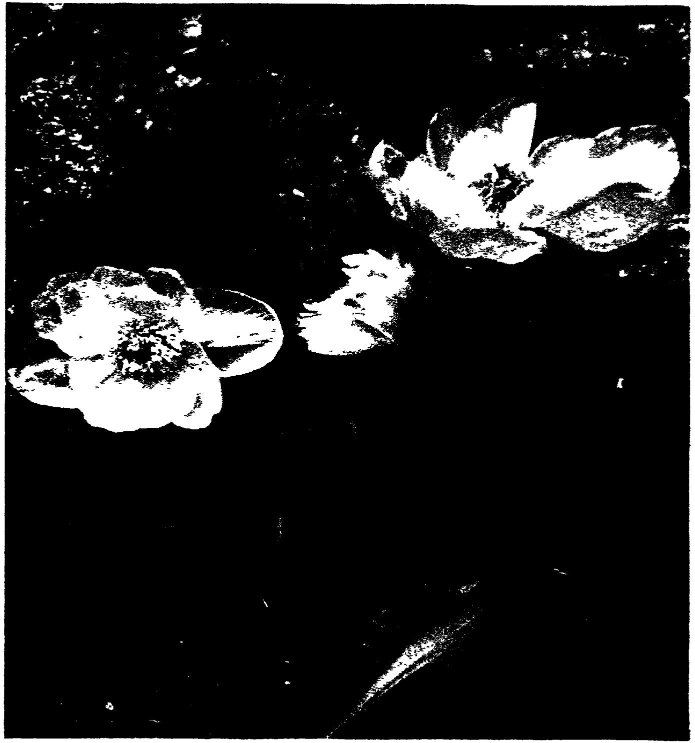
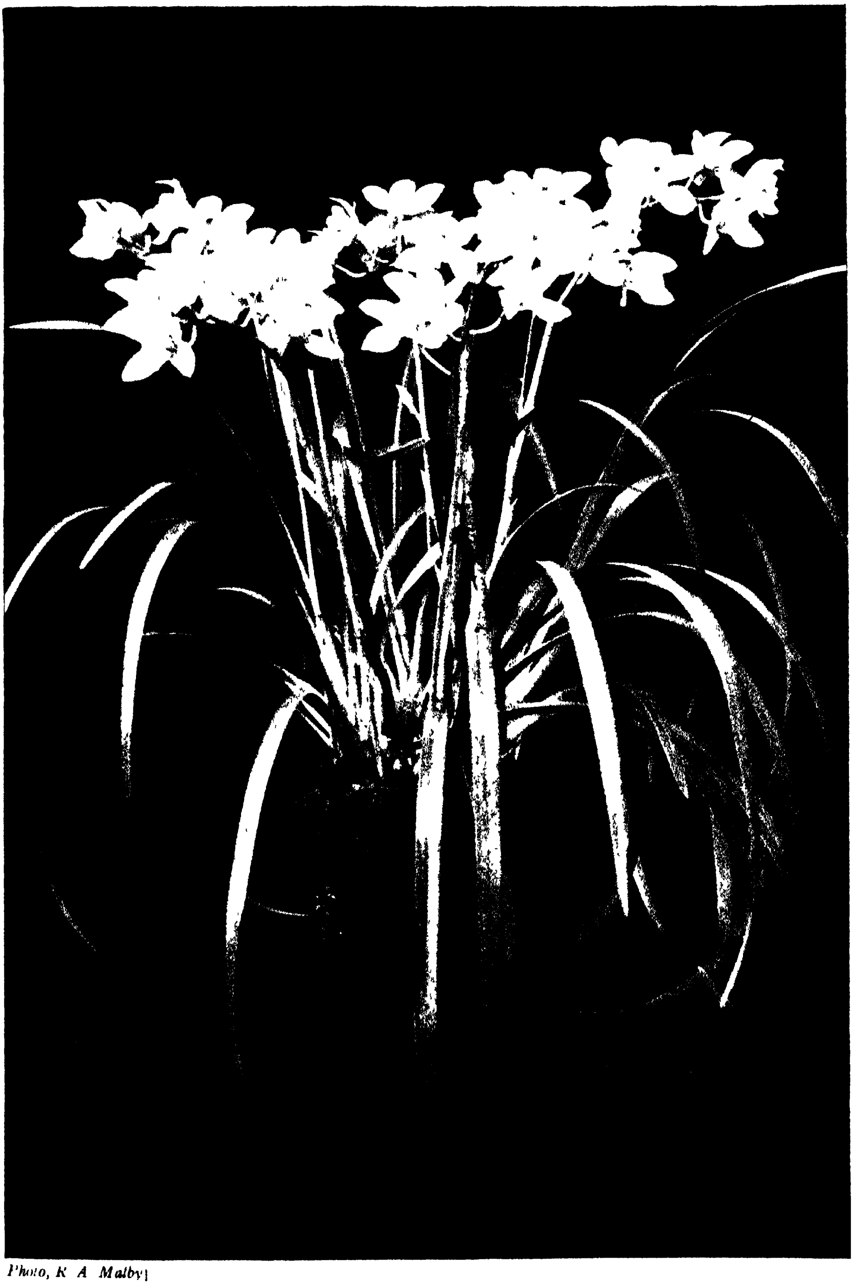


FIG. 123.—*Meconopsis integrifolia*, N.W. of Lhasa (See p 312)



Photo, R A Malby]

FIG. 124.—*Cymbidium* 'Swallow' Exbury var. F.C.C. April 29, 1947
(See p. 331)

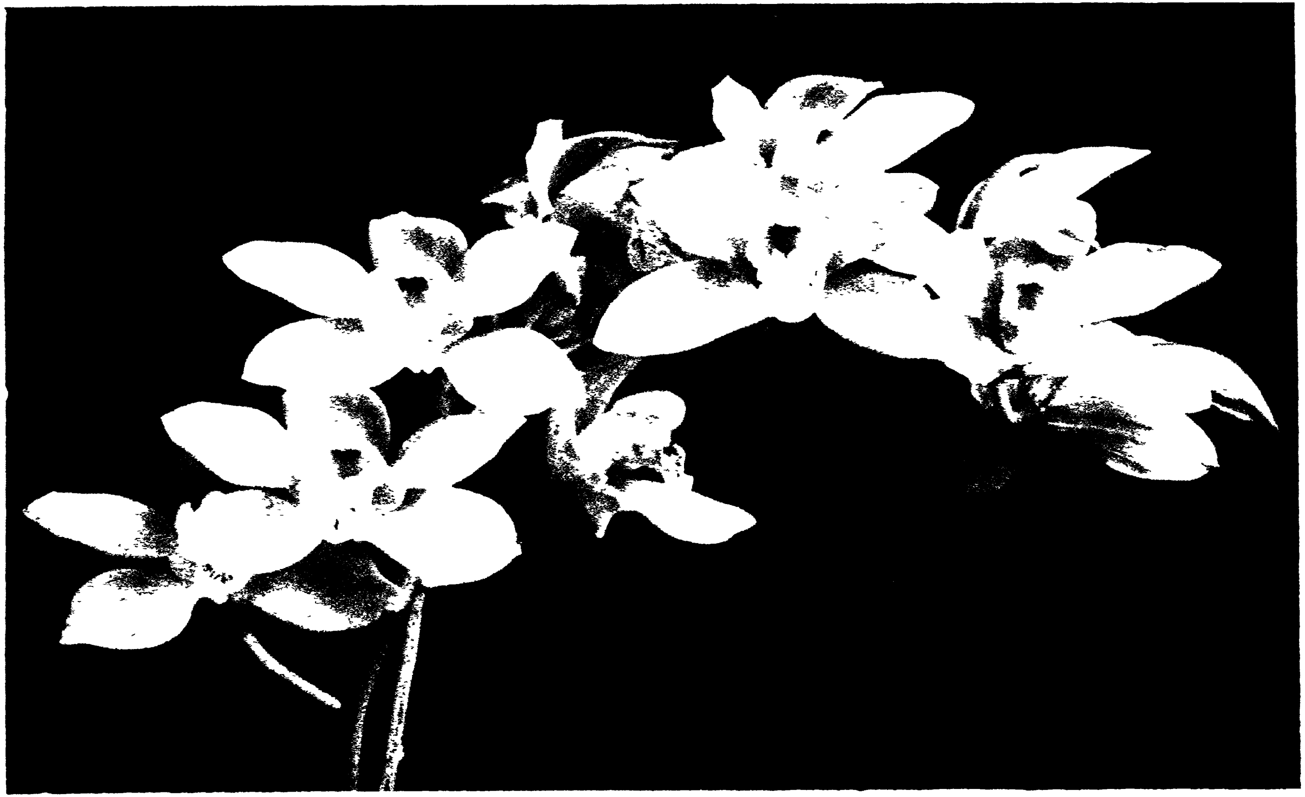
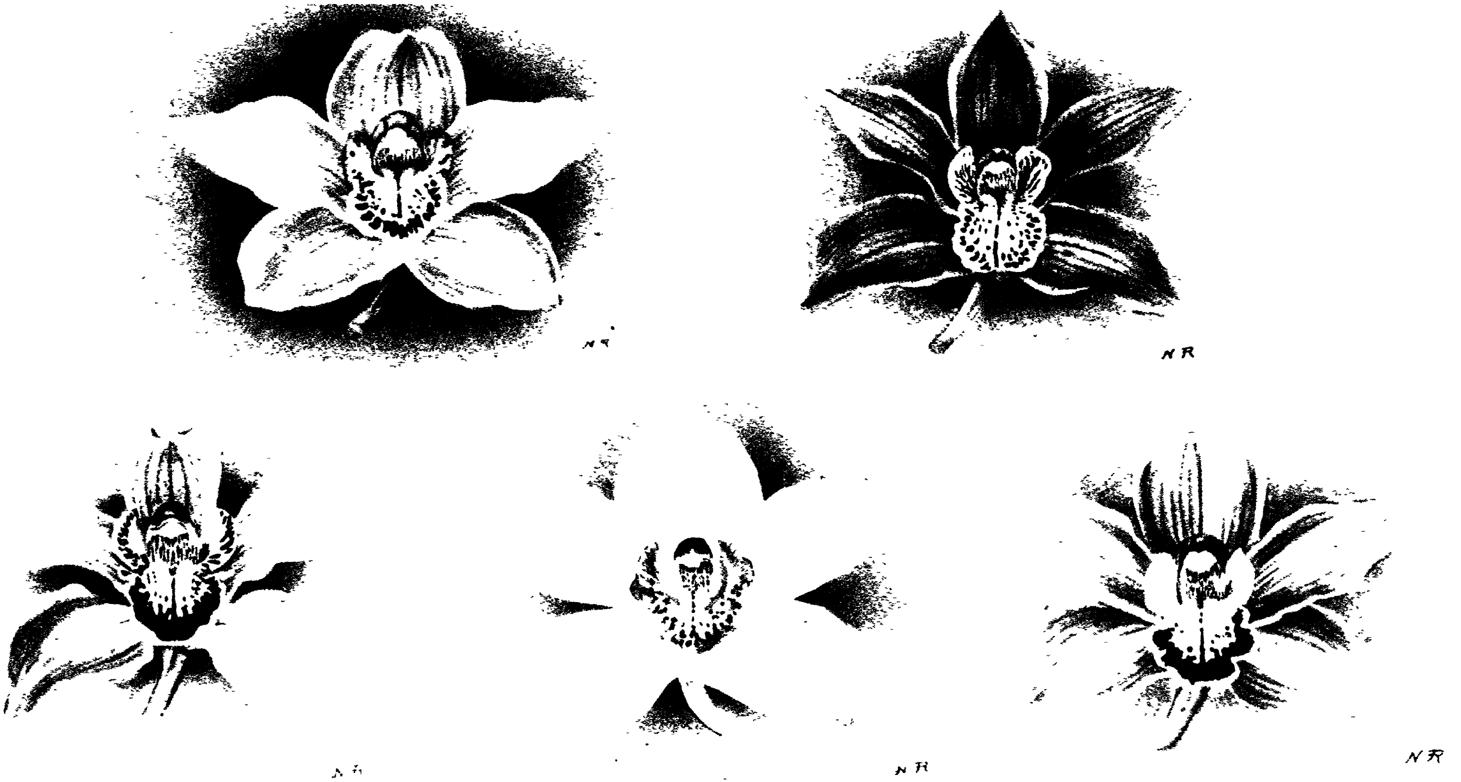


Photo R. A. Malby

FIG. 125.—*Cymbidium* 'Swallow' Exbury var. (See p. 331)



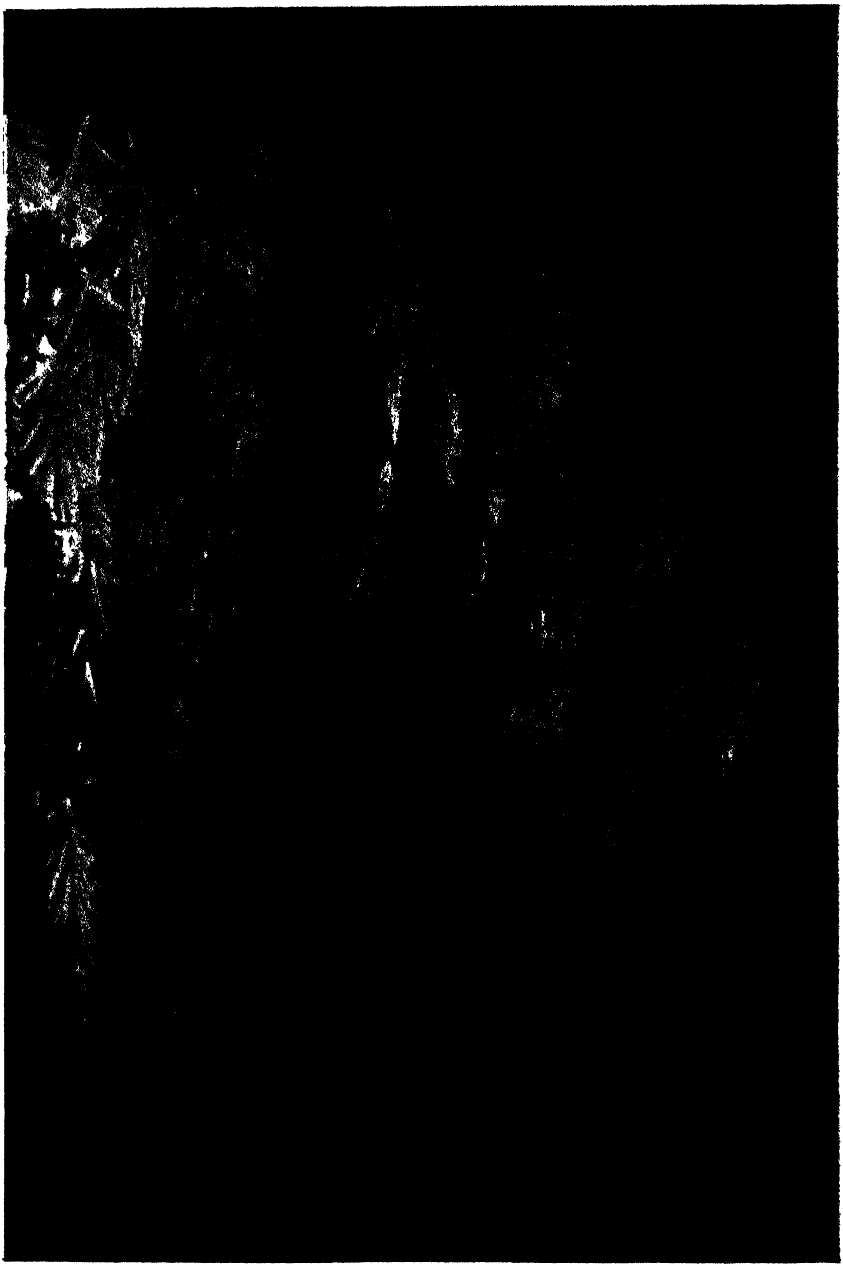
Drawings by Miss Roberts

FIG. 126.

Cymbidiums—Present-day hybrids

C. 'Nam Khan,' F.C.C. 1946

C. 'Nathaniel,' F.C.C. 1946



Colour photograph by Adprint, Ltd.]

FIG. 130.—*Kniphofia Galpinii* at Wisley (See p. 334)

or one quarter the size of the parent cell. However, increase in cell number is usually accompanied by an increase in cell size, that is the daughter cells enlarge until they become as large as the parent cell. This latter phenomenon is usually accompanied by another criterion of growth, namely differentiation. In their early stages all plant cells appear alike, but with increasing age they begin to differentiate —*e.g.*, some begin to develop into wood and some into bark tissues, some into leaves and some into flowers. Normally this follows a predetermined plan and normal development is said to occur. But occasionally the abnormal occurs. Freaks, monstrosities, sports or mutations appear in place of the accepted normal. These latter are extremely important from our present view point, because they indicate that living matter may express itself in almost innumerable forms. We have in fact only a faint perception of the total potential of natural forms because we provide only a limited environment in which this total potential may be expressed.

It is necessary at this stage to emphasize an important difference between plants and animals in their potential development, particularly as it relates to the power of reversing the process of cell differentiation. I suppose that at one time or another all of us have pruned away parts of our fruit trees and Roses. We do this because we know from past experience that the plant will renew these parts from the growth of eyes or buds which would otherwise have remained dormant. But in doing this work we take infinite care not to prune away the fingers of our left hand because we also know from experience that nature has made no such provision for their renewal. Animal flesh may knit together and it may even fill up small spaces, but in general we are born with a complete set of organs, which may grow by cell division and may increase in size, but only in rare cases—and these highly undesirable—do we have the initiation of new groups of activity dividing cells and the initiation of new organs—*de novo.* Not so the plant. It is characterized by the fact that any one of its living cells contains all that is necessary for the production of a new plant identical to that from which it was taken. As gardeners you know that you can obtain a complete new Begonia plant by pegging down a slit leaf on to sand. What you may not know is that this new plant is the result of the development of one cell, which returns to a primitive state and starts all over again. Plant cells have a power of regeneration which the animal cell has apparently sacrificed in return for mobility. The plant is characterized by the islands or pockets of undifferentiated meristimatic cells left at strategic places. Such islands of cells, which we call buds, may remain dormant for upwards of a hundred years, yet given the right stimulus they will develop into activity. From such a dormant bud a complete tree may be obtained. Indeed commercial fruit growing relies upon the transfer of such buds from desirable varieties into suitable rootstocks. The question is what is the local stimulus that makes one bud remain dormant while the adjoining one develops into a leafy shoot or a flower ? We shall see later that certain chemicals, when applied to these dormant buds, will cause them to remian dormant even when they are placed in an environment favourable for their development.

It is generally recognized that fruits, such as Apples, Pears and Plums are highly specialized parts of the plant. Yet it is not generally recognized that the fleshy part of the fruit which we eat and which surrounds and protects the seeds is really modified leaf tissue. The delectable part of an apple is in effect a number of leaves which have become fused at their edges and then become swollen or fleshy. The geneticist and the seed merchant are interested in the seeds which have developed from a single fertilized egg cell, but the commercial fruit grower is interested in the fleshy part of the Apple which is as much a part of the parent tree that produces it as are its leaves and stems.

Over the course of centuries we have come to regard the presence of seeds as an essential to fruit development as indeed they are in the varieties we have selected for wide-scale propagation. It is well known that fruits with a low seed content will fall at ' June Drop,' hence the emphasis on provision for cross pollination in our fruit plantations. But we must not let this state of affairs, which is the result of years of human selection, blind us to the fact that nature can and does produce many fruits which are seedless. Plants producing such fruits must be propagated by vegetative means, but that is another story. As seedless fruits we think of the Banana, the Marsh Grape Fruit, the ' Washington ' Navel Orange, the seedless Lime found in certain parts of California, the seedless Grape, the Japanese Persimmon to mention the most obvious. But even the varieties we normally regard as essentially seeded, can under certain conditions produce a complete crop of seedless fruit. CRANE and BROWN of John Innes report that the Plum variety ' Red Myrobalan ' when pollinated with ' Blue Rock,' produces fruits which are seedless—though not without stones. These fruits are smaller in size and earlier maturing than fruits produced by self-pollination. Even more important, as we shall see later, is a recent report by these workers that the recently introduced Pear variety ' Beurre Bedford ' produces pollen whose chromosome number ranges from haploid to tetraploid. They state that this " abnormal pollen " when applied to the stigmas of other varieties of Pears frequently stimulates the production of fruits, but that they are seedless. It is significant that although this variety produces such abnormal pollen, it is recognized to be a good pollinator under field conditions.

Probably the most outstanding case of the production of a seedless fruit is that reported by the Russian worker MICHURIN in his paper on " The Vegetative Pear." He says :

" This Pear which was found by P. N. JACKOULOV in 1931 in the mountains of North Caucasus bears no fewer than three crops a year, twice sexually and a third time vegetatively, a phenomenon unknown in any other perennial fruit tree. In spring it flowers and bears fruit of a medium size and quite good flavour, ripening in early July, after which a second blossoming begins, and at the same time the buds of the young growth develop small processes resembling fruit stalks on the end of which a number of buds develop, which later give rise to leaves. The petioles of these leaves gradually swell out until the end of August or September by which time the fruits of the second set of flowers are ripening. About this time the enlarged petioles (described above) fuse into a solid pear-like mass so that they are ultimately indistinguishable in flavour and size from the normal fruits produced from flowers. The ' leaves ' whose petioles had fused to form the ' fruit ' remain at the calyx end of the ' pear ' and occupy exactly the same position as the calyx of the normal flower."

For obvious reasons I cannot vouch for this statement, but there would be no good reason that I could think of for inventing it. If it be true, however, the plant is of the utmost importance to the physiologist, anatomist and geneticist alike for it shows features that link it to the more primitive and more advanced forms of plant life. The report says that this plant has been propagated by grafting it into stocks in a garden, so that the above unusual phenomena are embodied in the meristimatic cells of the buds.

The important point to notice is the fact that the edible part of an Apple or Pear is composed of cells derived from the parent tree, whereas the seed is derived from a single fertilized egg-cell only part of which was derived from the parent. The rest came in with the pollen. The fertilization of the egg cell by the nucleus from the pollen tube is followed by rapid and continuous cell division, resulting in the development of a seed. But this rapid cell division is not confined to the embryo. It spreads out as it were to the surrounding maternal tissues and they too begin to undergo rapid cell division. Increase in size during this period is very small because the daughter cells remain small, but at a point somewhere in late June or early July this cell division begins to slow down and a period of cell enlargement takes its place. This change from a state of rapid cell division to rapid individual cell enlargement marks a critical period in the development of the fruit, and is in some way not yet understood, connected with the phenomenon we call ' June Drop.' From this time onwards the " growth " or as we ought to call it the increase in the size of our fruit is due mainly to cell enlargement. Obviously the growth regulating substances that are operative during the stage of rapid cell division can hardly be the same as those that are operative during the cell enlargement period. Indeed, as we shall see later, materials are now available that will prevent preharvest fruit drop, but these will not prevent ' June Drop.'

Since both plants and animals start life as fertilized egg cells—although plants may be continued almost indefinitely by the transplanting of buds on to young roots—we cannot escape the conclusion that such a cell with its nucleus, cytoplasm, electrolytes, enzymes and co-enzymes contains an unknown potential as regards form and shape. The problem is what are the factors which determine this potential into ways which we have to come to regard as normal or abnormal ?

All this rather long preamble was necessary to provide even a simple background for a study of plant-growth regulating substances. In an attempt to convey more clearly what these substances are, one worker has aptly called them " Growth Correlation Carriers." Let us examine a particular case. We have already indicated that plant cells undergo division in such a manner that each new cell gets a half of everything that was in the parent cell. During this process the chromosomes which in the non-dividing cell lie end to end and are wound up into a tight ball, unwind and split length-wise. The two halves of each chromosome are then pulled apart by " spindle fibres " which develop in the cytoplasm. Colchicine, which is a very active poison extracted from the bulbs of the autumn Crocus, will, when properly applied, inhibit the development of the spindle fibres without affecting the preceding processes of cell division. Thus, when a mass of dividing cells such as developing egg cells or spore mother cells are treated with colchicine the chromosomes undergo division but are not pulled apart. They, therefore, reunite and a nucleus with twice the normal number of chromosomes results. Plants developed from such cells are abnormal, and are frequently " giants " which is not surprising since they have a double dose of everything. Nature produces the odd " giant " from time to time and seems to have done so since time immemorial.

In the horticultural world these giant forms are in many cases desirable, and it is not surprising, therefore, that this particular aspect of plant growth should have been given its fair share of attention. Many substances other than colchicine have been tried from time to time, particularly these chemicals which are suspected of being concerned with that most undesirable form of cell activity which we call cancer. But one of the most startling applications of the use of colchicine has recently been announced from Holland. It is well known that while Rye will grow on poor sandy soil its yield and food value is relatively low. Wheat on the other hand, will not grow on such soils. Unfortunately, although Wheat and Rye may be crossed, the resulting plant has an odd number of chromosomes so that the resulting plant is self-sterile. Under ordinary circumstances there is therefore no hope of producing a fertile Wheat cross Rye seedling by the ordinary method of cross-pollination. But Dr. WILLENSIEK at Wageningen took a large number of these first cross Rye Wheat seedlings and subjected them to a colchicine treatment thereby doubling their chromosome number, and at the same time restoring self-fertility to the seedlings. Dr. WILLENSIEK has now a large number of these completely new species of plants and selection is already under way. The new plants have the ability of Rye to grow on poor sandy soil, but the grain has a high food value almost approaching that of Wheat. This contribution to the potential food supply of man and beast is hard to evaluate but it is certainly very large indeed. From our present point of view its importance lies in the fact that it is based upon the planned use of a growth regulating substance to double the chromosomes of a self-sterile plant in order to restore it to a state of self-fertility. This achievement opens up completely new avenues of approach to the practical problems of providing new species of plants for areas that are at present without this staple form of foodstuff.

Charles Darwin was the first British investigator to call our attention to the possible existence of growth regulating compounds in plants. Describing his experiments on the response of plants to unilateral illumination in 1881 he deduced that there must be material substances which were moved about the plant and which determined its response to a particular environmental condition. Unfortunately, chemistry was not sufficiently advanced at that time, and no material evidence was forthcoming in support of this hypothesis. Other famous botanists such as Sachs and Loeb have all postulated the existence of " flower growing," " root forming," " stem forming " and " growth inhibiting " substances, but they all died too early to see their ideas vindicated. Now, of course, we have over a hundred of such substances affecting one or other of the many phases of plant growth and development, and the number increases with every publication of the scientific journals devoted to the subject.

You must all be familiar with the way in which plants bend towards a source of light. This bending has now been shown—as Darwin postulated—to be due to the influence of a growth regulating substance produced in the growing tips of the plant, and a standardized technique has been developed to test for the presence or absence of such substances. Oat seedlings are grown in the dark so as to produce plants that are more or less free from this phytohormone, which develops in seedlings grown in normal daylight. While still in the dark the seedling tips are removed and a small piece of gelatin or agar containing a small amount of the test substance is placed on one side of the decapitated seedling. If the seedling responds by showing curvature when it is brought into the daylight the substance is said to be physiologically active. The amount of bending is a measure of its physiological activity at a given concentration. By this method reliable workers can detect the presence of auxins at dilutions of 1 in 100,000,000, or one pound of substance in 44,000 tons of water. More recently an even more sensitive list has been evolved using small pieces of the first internode of Sunflower seedlings and culturing them on agar slopes in sterile conditions. The author reports that by this method he can detect the presence of growth regulating substances at dilutions down to one part in a thousand million or one pound in half a million tons of water ! The method is so sensitive that it has been used to demonstrate the presence of root-growth stimulating substances, probably beta-indole acetic acid in samples of commercial penicillin. The crystalline penicillins G and X were shown to have root initiating properties by this means, but this was not due to beta-indole acetic acid in that they failed to induce cell proliferation when used at higher concentrations. These are admittedly outstanding cases, but they do emphasise that the amount of active substance involved in some of these growth phenomena is extremely small. Less than " the dust of the balance " in fact. Furthermore, it should be insisted in passing that the effect of these substances is frequently highly specific. Substances which sensitize cells to the action of light may be without any influence in other phases of growth.

The story of the first isolation of plant-growth regulating substances is fascinating, and while it cannot be told in detail it must be added in outline, if only for its human and historical interest. It was evident that the amount of these substances that were present in normal plant tissue was so small that their isolation would always be very difficult. A more profitable source was therefore sought. During experiments directed towards another end, it was found by Dr. KÖGL and his colleagues at Utrecht that animal urine had marked effects upon the growth of plant cells. Large quantities of urine were therefore extracted and two active substances were isolated from it. These they called Auxin A and Auxin B. The one was so closely related chemically to the other that it was easy to see that they were in some way linked together and their presence was not fortuitous.

The presence of two physiologically active substances in urine led to a flood of questions. How did they get there—were they produced by the animal or were they taken in with the food and put out as waste products of metabolism ? If there were two such substances might there not also be others not as yet detected ? The hunt for new substances was definitely on, and from that time until now scientists have been uncovering very good reasons for the emphasis which the practical gardener has always placed on the use of farm-yard manure and composts. It is now known that both Auxin A and B can be extracted from germinating Barley, yeast, and certain vegetable oils, so that its presence in urine can be accounted for quite easily. Incidentally the amount of these substances to be found in urine depends largely upon the diet of the animal. This was shown in Holland during the German occupation when the food intake of the civil population was so low and of such poor quality that no growth regulating substances could be extracted from the urine. This fact also explains in some measure the contention of my father who always maintained that there was farm-yard manure, and farm-yard manure, and that quite apart from the nitrogen phosphate and potash content it took more manure from the rearing yards to produce the same growth of root crops than from the milking sheds where the animals were given lots of good food. Yet my father knew nothing of growth regulating substances.

In urine there is also a third substance which is a powerful plant-growth regulator. This was also discovered by KÖGL at Utrecht in the following manner. On one occasion they had difficulty in repeating the usual extractions of Auxins A and B, and this led them to concentrate their attention on a particular patient, a youth, whose urine was found to be five times as active as normal, but in a rather unusual direction. Finally they isolated a new substance which proved to be 3-indole acetic acid, a substance that had been known for many years although its physiological activity as a plant-growth regulator had never been suspected. This discovery only served to intensify the search. If one organic substance is active, might not others of a like nature also be active ? And so it happens that at the moment most of the substances known to be physiologically active are laboratory made materials, and only a few have so far been isolated from plant tissues.

We have already indicated that in some way not yet understood the nucleus controls the metabolic activity of the cell, but that as the cell grows older this control is weakened and may even be overcome by the use of X-rays or certain chemicals. We must now remind ourselves that there are several kinds or modes of growth and that substances which affect the one may be without effect upon the other. As horticulturists you are all familiar with the fact that when you place a plant in a warm, dark damp room it will increase in length at the expense of thickness. It becomes etiolated, as we say. Examination shows that this undue increase in length at the expense of thickness is due not to cell division but to an undue longitudinal stretching of the plant cells. There are approximately the same number of cells in the elongated internode of the etiolated plant as in a normal one, but they are long and narrow. Under conditions of high light intensity and physiologically dry conditions the internodes may fail to elongate; as in the case of fruit spurs. We now know that Auxins A and B induce stem curvature by affecting the rate at which cells elongate on opposite sides of a stem. Bending towards the light is due to a greater cell elongation on the darkened side. It is not known for certain whether this differential effect is due to the darkened cells being made more elastic or the illuminated ones more rigid. In contrast, materials such as 2–4-dichlorophenoxyacetic acid will cause plants to develop radially at the expense of elongation. Such substances can be used as weed-killers producing their effect by a dislocation of the normal processes of growth.

What are growth regulating substances and how do they act? We have already indicated that they are organic substances of more or less complex structure, which since they are present in such small amounts cannot be acting as foods or nutrients. The modern theory is that they act in the same way as enzymes. Indeed, they may turn out to be enzymes with a very limited range of environment in which, they will function. The simplest explanation as to how they act is to regard them as templates or patterns on to which, or around which smaller, simpler molecules may orientate themselves. The shape and size of the molecule and the spatial relationship of the elements to each other is more important than its percentage chemical composition, since chemical and stereo isomers, have very different degrees of physiological activity.

A partial clue to the problem of how these substances work may be forthcoming from recent studies of the action of sulphonamide drugs and the starch-digesting enzymes. It is now generally accepted that the sulphonamide drugs produce their effect by masquerading as molecules essential to certain living processes. They are therefore accepted by, or become built into a molecule but the substance produced is incapable of taking its proper part in the next step of the reaction. Further synthesis is thereby " blocked " as we say. The fermentation or breakdown of starch to sugar in germinating seeds—as in the malting of Barley—was at one time supposed to be the work of a single enzyme, amylase, which was easily extracted from yeast.

Recent research has shown that natural amylase is a mixture of separate enzymes each one of which can carry out one step of the process and one step only. It is therefore possible by appropriate means to stop the fermentation process at any desired stage merely by removing or inactivating one of the numerous "amylase" enzymes. Since starch is almost certainly built up from sugars by the same enzymes working under different conditions, this recent discovery may ultimately help us to understand how such complex polymers as starch and cellulose are built up from the simple sugars. Obviously an understanding of the way in which substances such as enzymes, growth regulators, vitamines, hormones and highly effective insecticides such as DDT and hexachlorocyclohexane produce their effect is of the utmost importance to a rational development of these fields of applicational science. It is not surprising, therefore, that many workers in U.S.A. are turning their attention away from the trial-and-error testing of large numbers of new compounds to a study of the fundamental chemistry of insect and plant proteins and amino acids. Work of this kind must be regarded as "highly academic," just as the original search for the substances causing plants to bend towards the light was at one time highly academic. But it is upon the solution of these academic problems that practical horticulture must rely for its knowledge and future development unless it is content to remain rule of thumb and empirical.

We can now turn our attention to a more general survey of the problem. Strange as it may appear, most of the substances known to be physiologically active are the products of laboratory synthesis. They have been produced for the purpose and some of them have no other use at present. On the other hand, the auxins are very complicated molecules, and so far as I am aware, have not yet been synthesized in the laboratory.

Although we apply single substances such as alpha-naphthalene acetic acid or 3-indole acetic acid for the control of certain plant responses, it is by no means certain that these materials act alone. It is my considered opinion that nature uses these materials in combination and in sequence and at least one case is known where two chemicals must be applied simultaneously or in combination in order to produce a desired result. Since in my opinion a piece of work by THOMAS and DREW at John Innes is likely to become "classical" in this particular field of investigation I would like to quote from their own report. Their objective was to produce "giant" forms of certain plants not by the use of colchicine but by other chemicals. After stating that previous to their own report, carcinogenic hydrocarbons had not been known to produce polyploidy in plants they say:

"It was therefore with some surprise that we found recently on examination of the root tips of rye seedlings which had been growing in water containing crystals of 1,2,5,6-dibenz-anthracene, a striking polyploidogenic effect. This did not occur in the controls with water alone.

"We repeated the experiment but found only normal growth and it was some time before we traced the reason for the first result. At that time we had been working with organic mercury compounds such as are used for dusting seeds to prevent fungal attacks. These compounds are crystalline solids, but some have an appreciable vapour pressure, and even at room temperature will give off a toxic vapour. This led us to suspect that the laboratory air may have been vitiated and we repeated our first experiment in an air that was in equilibrium with solid ethyl mercury chloride. The result was precisely as in the first experiment, namely a definite chromosome doubling.

"Further trials showed us that a very dilute solution of ethyl mercury chloride would give the same result, and had the advantage that the dosage could be controlled."

They then proceed to record the results of a series of trials with varying concentrations of dibenz-anthracene and ethyl mercury chloride and continue as follows:

"It will be noticed that only very minute concentrations of the reagents are involved and that there is a limited range of effectiveness. Dibenz-anthracene alone has no effect upon mitosis at any concentration, while ethyl mercury chloride alone has only a slight effect at a concentration of 0·5 part per million (*i.e.* one in two million). At half this concentration, *i.e.* one part in four million, even ethyl mercury chloride alone has no effect, but when used in conjunction with dibenz-anthracene, its effect is most pronounced.

"Evidently the ethyl mercury chloride is the direct polyploidogenic agent and the dibenz-anthracene facilitates its action. The observation by LISLE—which we have confirmed—that dibenz-anthracene *reduces* the ability of lipoids to inhibit the oxidation of fats may show how this comes about.

"It is too early yet to decide the exact rôle of these two reagents and a systematic study of similar pairs of substances is needed, but this example of a complementary action suggests a new line of attack on both chromosome and cancer research."

Bravo!—may I add that these observations will also be the starting point of a new line of attack in the problem of how growth regulating substances act, and in my opinion is one of the most significant contributions to the problem of growth regulating substances since the first isolation of Auxins A and B from animal urine.

Those of you who are familiar with the scientific ramifications of these problems will recognise at once the similar effect of dibenz-anthracene working in conjunction with ethyl mercury chloride with that of enzyme action. Indeed, we must never forget that there is no such thing as an enzyme, but only an enzyme *system*. If, therefore, we are unable to provide you at this stage with a good working theory of how growth regulating substances act, I hope you will appreciate that this is due to the complexity of the problems involved. Living processes are in the last analysis controlled oxidation-reduction processes taking place in mono-molecular layers which are themselves spread over a complicated network of proteins, fats and carbohydrates. Professor DARLINGTON and his colleagues at John Innes know just how complicated these systems can be, but as plant physiologists we shall not make much progress until we too attempt an understanding of them, difficult though it may be.

We said earlier that the science of plant-growth regulating substances is only about twenty years old. But the art of using them is as old as mankind himself, or so it would appear. In 1629 a certain Mr. J. PARKINSON recommended fruit growers in England to treat canker in fruit trees by " wetting it with cows' dung and urine till it be destroyed." PARKINSON seems to have started something because in 1791 M. W. FORSYTHE recommends a paste of cows' dung and other ingredients to promote the healing of wounds in trees. Those of you—if any such remain in the Royal Horticultural Society—who have no use for these new fangled scientific notions can take comfort in the fact that science rarely proves an established practice to be erroneous. Indeed it usually ends by providing the reason for the establishment of such a practice. The making of a grafting wax with cows' dung and clay may have been well founded and the dung may, in the first place have served as more than as a binding agent for the clay. Who knows ? Modern science now provides us with the means of doing all these things and many more, both easier and with a much higher degree of certainty.

I cannot conclude this survey without reference to the work on plant growth regulating substances occasioned directly by the war. Biological warfare, which means employing germs, toxins, diseases and life destroying or deranging materials against man, his animals and his crops, was at all times a potential threat, and only our mastery in the air and our ability to reply with similar materials at an equal or greater rate prevented the initiation of biological warfare on a vast scale.

As a direct result of this threat by the enemy, a special Biological Warfare Project was set up in U.S.A. which at one time was employing 3,900 army personnel, many of them leaders of scientific development in their own fields. In addition, work along similar lines was in progress at many of the Universities and in the laboratories of many large chemical firms.

A part of this project was directed to a search for destructive agents against a wide range of food crops, and the search proved highly successful. Over 1,000 new compounds were synthesized, formulated and tested and only the rapid ending of hostilities prevented the first large scale trial of these substances from being made. The synthetic agents that would have been employed would have been harmless to man and his animals, but would to all intents and purposes have rendered certain of his crops sterile. Not until the approach of harvest would he have realized that he could not reap the reward of his labour.

Intensive research in similar lines, although on a much smaller scale was in progress in England mainly in the I.C.I. laboratories at Jealots Hill. A recent report claims that the principle of selective weed control by the use of plant-growth regulating substances was discovered at Jealots Hill and applied to growing crops of cereals in 1940. The early work at Jealots Hill and Rothamsted was reported in full to the Agricultural Research Council in November 1942. The publication of the results of this work was delayed by official secrecy regulations and has only recently been made available to the general public. The materials developed at Jealots Hill and in U.S.A. will be discussed in the second lecture.

The main results of this work in England and U.S.A. will eventually become available to the public, but on the other hand, some of it will almost certainly remain the property of those who initiated and carried it through. But in the meantime it can be said with certainly that many new chemicals were prepared and put on trial; new methods were developed to improve their effectiveness in use; new knowledge was gained on their relative selectiveness; valuable correlations were obtained on the effect of soil, humidity and time of application; new knowledge was gained on the effect of these compounds upon soil flora and fauna; and last but not least, new information was obtained on the most effective drop size when these materials were used as aerosols and the most effective carriers, *e.g.*, oils, water and dusts.

Indeed, so fast does modern science develop that within the space of twenty-five years academic curiosities such as the substances that cause plants to bend towards the light have become highly important materials in the arsenal of modern warfare.

What then have we learnt? The chemical and biological sciences are producing or isolating and developing the use of substances which we call growth regulators, vitamins, or hormones, depending upon their origin and the growth activity which they effect. It is important to notice that these substances are not foodstuffs or manures, yet they are as essential to the life of the plant or animal as are foods and nutriments, and they produce effects out of all proportion to the amount that is present at the seat of the reaction. In this respect they are like the enzymes of living matter and the catalysts of the modern industrial chemist. The latter is in fact trying to copy the former, but whereas living processes take place at normal temperatures and pressures the industrial chemist uses high temperatures and pressures. Furthermore, these growth regulating substances have critical concentrations, that is they are like the ethyl mercury chloride described by THOMAS and DREW. At one concentration, say ten parts per million they induce a particular organization of plant cells, whereas at one hundred parts per million the effect is neither a hundred times more intense nor one hundred times more rapid, it is something quite different. Moreover, their effect is specific. Because a growth substance will induce bending, it does not follow that it will induce parthenocarpy or polyploidy. There is therefore no one test that may be applied whereby we can say that a substance is or is not a growth regulator. The issue is still further complicated by the fact—at least that is my considered opinion—that these substances do not act alone. They either act in conjunction, or what is more probable, in chain-like reactions whereby the end point of one reaction is the starting point of the next, etc. As evidence of this I would draw your attention to the recent work on the hydrolysis of starch by the Amylasis Enzymes. Without being able to discuss the matter further at this point, the development of this idea may ultimately give us the clue to the apparent spontaneous development of these substances we associate with virus diseases. But that is another story, although not so far removed from our present study as you may imagine.

We have also learnt that in spite of all our modern techniques we do not know what substances nature uses as growth regulators for the majority of its processes. We have so far only isolated a few of them. The animal physiologists are much further advanced in this respect than are we, and I envy them their knowledge. We have developed a large number of substances that will apparently act in the same way as the natural substances, but since many of these are highly chlorinated compounds they are not likely to occur in plants. And so there is a serious gap in our knowledge, which must be closed as soon as possible. My successor at Long Ashton Research Station has already begun to follow up this line and I hope that he will be successful in his search. The project deserves every support it can get.

We have also learnt that when a substance can exist as a number of isomers, all of the same percentage composition but of different shape or spatial configuration, then one of them will be much more effective than the others. This suggests that it is the shape and size of the molecule that is important—as it is in the case of enzymes—and that these substances may act as templates or that they may enter temporarily into the structure of a molecule, only to be replaced by something else.

The functional activity of hæmoglobin may be cited as an example of the way in which these substances may work, although there are points of essential difference. As it occurs in the normal blood stream hæmoglobin can act either as an acceptor or donator of carbon dioxide and oxygen, depending upon purely local conditions in the body. These two substances form loose chemical complexes with the hæmoglobin which are easily broken, leaving the hæmoglobin in its original condition. Although it functions in this way towards the fully oxidised form of carbon—viz. CO_2—its reaction with the less oxidised form—viz. CO—is quite different. Hæmoglobin and carbon monoxide unite to form a very stable chemical complex. The presence of small quantities of CO " blocks " the normal functioning of hæmoglobin and therefore acts as a poison to warm blooded animals whose deep-seated oxidation-reduction processes depend upon the functioning of hæmoglobin in the blood stream.

We have also learnt that in many ways science is applying its knowledge to the economic problems of mankind. Dr. Willensiek has pioneered one way to the production of as many new species of plants as man may think necessary and desirable.

How eagerly would that " giant " of English biologists, Mr. CHARLES DARWIN, of immortal fame, have listened to a lecture such as this.

We can now describe in detail some of the materials which determine the course of nature. But what is much more important we can use them to serve our ends, whereas Darwin could only postulate that such materials must exist. Here at least we have one instrument—a group of chemicals—which can affect life and mould it into the traditional patterns with which we are already familiar, or cause it to show new forms or exhibit new functions. We are in fact only just beginning to realize how great is the potential of living matter, how wonderful and varied its forms may be. The use of growth regulating substances is one of the ways in which we can make use of this potential, either to our damnation or to increase the variety, the quality and the quantity of fruits, flowers and vegetables, available to mankind.

CYMBIDIUMS

By B. Hills

MANY years have passed since I made my first efforts in the cultivation of Cymbidiums. It was back in 1900, and at South Lodge, Lower Beeding, Horsham, the residence of Mr. F. DU CANE GODMAN, and I remained there for ten years. There were quite a nice lot of Orchids in that collection, though Cymbidiums were few in numbers, and mainly varieties of the old species *Lowianum*. They were grown in a lean-to house, facing South, and they grew fairly well, though rather inclined to become ragged in shape, due, I think, to the fact that the light they received came nearly all from one direction. Rarely did they send up new growths from the back part of the plants. I noticed this all those years ago, and nearly thirty years afterwards when I came to Exbury I found the same thing happening when the plants were grown in the big corridor house, also facing south. Much more shapely plants predominate when they are grown in houses running north to south, with side lights to help the distribution of light. In July, 1910, I went to Westonbirt, under my great friend, Mr. H. G. ALEXANDER, and stayed with him for seventeen years. Eventually, in August 1927, I had the good fortune to be selected to go to Exbury as Orchid grower to Mr. LIONEL DE ROTHSCHILD. This gentleman was a great expert on Orchids, and particularly so where Cymbidiums were concerned. Everything necessary for doing the job was provided, and things went wonderfully well until war came in 1939. However, we are again on the up-grade, and in a year or two I hope we shall have regained much that was lost in those long years of war.

And now to some observations on the actual growing of these lovely Cymbidiums. My system of growing the plants is very much on the Westonbirt lines, and it would be surprising if it were not, for I doubt very much if some of those marvellous exhibits will be surpassed for many a long day. Well do I remember the fine group of hybrids which contained marvellous specimen plants of *C.* 'Butterfly' (*Lowio-grandiflorum* × *insigne*). This old hybrid has a lovely arching habit, and would be useful in groups to-day. It has also proved to be a fine parent. So indeed has *C. Pauwelsii* and *C.* 'Ceres,' each having *C. insigne* as a parent. Such crosses lend themselves to specimen culture for they are free growers and possess wonderful vigour. Very different in character are many hybrids produced from *C. Parishii*, *C. eburneum* and *C. erythrostylum*, though some of them grew fairly well. However, glorious hybrids have evolved from their use, take for instance *C. Alexanderi*, Westonbirt variety (*eburneo-Lowianium* × *insigne*), *C.* 'Merlin' (*Alexanderi* × 'Dryad') and 'Flamingo' (*Alexanderi* × 'Merlin'). I was at Westonbirt when those grand things were raised and flowered many years ago, and well remember the sensation they caused. Since then they have been surpassed in some respects, but I doubt if any hybrid of bygone days has produced so many fine things as *C. Alexanderi*, Westonbirt variety. What a grand batch of glorious hybrids was that of *C.* 'Dorchester' ('Tityus' × *Alexanderi*). They were very, very fine indeed. Later on came *C.* 'Rosanna' ('Kittiwake' × *Alexanderi*), the best variety of which eventually came to Exbury from Westonbirt. Mr. ROTHSCHILD lost no time once the plant arrived here, *C.* 'Balkis' ('Rosanna' × *Alexanderi*) being one of the first really good things to be raised here in his new houses. *C.* 'Balkis' has been used at Exbury as a parent, but we have to wait some time yet to see what the results of its use are to be. After some remarks on the general cultivation and propogation of these Cymbidiums I will make further reference to the influence of *C.* 'Rosanna' as a parent plant. It has bred many wonderfully fine things.

Repotting.—Most seedling Cymbidiums grow freely, at any rate, until they have flowered once or twice. By that time one can usually see where vigour exists and where it is more or less absent. Instinctively, a grower senses which may safely be potted on into larger pots and thereby progress towards specimen size. It is equally obvious to his experienced eye where it would be more advisable to remove some of the old compost and give them more or less a fresh start in some new rooting materials, using comparatively small pots in such instances. If an unhealthy plant is "potted on" into too large a pot, in nine cases out of ten the plant will go back in health, for the limited amount of root action of such members is such that only a very little rooting compost is needed at that period. Again, such plants suffer from the slightest error in regard to watering, and the danger of overwatering is much less if the roots are accommodated in a smaller receptacle. After repotting, the compost should never become saturated, but, later on, when the roots have got a firm hold upon the new materials, more liberal amounts of water may be given when the compost has become reasonably dry. Such plants should be repotted in a very fibrous mixture—about equal parts Osmunda fibre, loam fibre, and clean Sphagnum-moss, and all fine materials should be sifted out of the compost before mixing the ingredients. A similar mixture as this is suitable for the strong plants of specimen size, though where extra vigour is present somewhat more loam fibre may be included. In all cases the ingredients should be cut up in accord with the size of the plants being treated. It is a great mistake to use unduly long and coarse compost for small plants, and *vice versa* where large plants are concerned. Good drainage is essential in all cases, and particularly so in the case of very large specimens.

And when repotting these large plants, before commencing the task, make sure the centre of the old ball of compost is in good condition. If considered satisfactory, the plant may be merely lifted on into a larger pot, and such subjects should be potted firmly, pressing the surface layer of compost very tightly up to the base of all bulbs and growths. This is a very important detail. If, however, the old compost in the centre of the ball should be decayed, then remove it carefully, also any dead or diseased roots in the vicinity of same. After this, before inserting the plant into its new pot, press some fresh materials firmly into the cavity caused by removal of the old, and then continue to finish it off by normal procedure. If this is done one will find that shrivelling of the central bulbs is not so likely to occur, and the plant will most likely grow to be a specimen, well supplied with leaves on the older bulbs. After repotting, care must be exercised when applying root moisture. For a few weeks the plants will not need much water, but, soon, root action will increase rapidly, and then much more liberal supplies will be needed. With large plants it is specially necessary to allow them to become fairly dry before rewatering them, for a large ball of compost usually remains moist for a longer period than is the case with smaller objects. Spring—early spring in some cases—is the best season for doing most of this repotting. In the case of plants which have flowered this season and where repotting is necessary, allow a few weeks after cutting the flower spikes before disturbing them, for the burden borne by some of them is rather heavy, and a slight period of rest should be given before repotting them.

Smaller, unflowered seedlings may be repotted any time from early spring until mid-autumn, for as a rule they will be grown in a slightly warmer house than those of adult size. Plants of flowering size should, however, be repotted by the end of spring, for I am convinced that late repotting of such members tends to make them shy of flowering the following season. Within reason, therefore, the earlier the large ones are dealt with, the better their prospects of producing flower-spikes.

Temperatures.—During the winter months it is difficult to give any definite figures on this very important matter. Inside temperatures, in my view, must very largely be in accord with the climatic conditions prevailing at any time. We had a very severe winter in 1946–1947, and we have yet to see the full consequences of abnormally low readings. Up to the present I cannot say that I can see much harm has been done in the Cymbidium houses. Yet on frequent occasions the early morning reading of the house was down to within 5° of freezing point. On one occasion the inside reading was as low as 35°. So far I see no definite signs of serious trouble. But many plants which definitely like more reasonable temperatures appear to be very backward at this season. In addition flower spikes in varying stages of development during February last remained static for several weeks, but in the end all flower-buds opened normally—but later than usual. So this is what they can survive under exceptional circumstances. Under normal winter conditions, I think an early morning inside temperature of about 45° is as low as is safe, especially if a cold night follows a day when watering operations have taken place. Much depends upon the condition of the rooting compost in which the plants are growing. If it is unduly moist when temperatures are too low, the greater the danger to the health of the plant. During the past winter all plants here were kept very dry indeed, for this was the only way one could hope to keep them alive. Much depends upon the breeding of the various types, and upon the natural habitats of the parents used in producing the hybrids of to-day. Plants of the *C.* 'Ceres,' *C. Pauwelsii, C. Lowianium* types stand up to much lower temperatures than will many of the kinds where *C. Parishii, C. eburneum, C. erythrostylum,* predominate, and we must always bear this in mind.

When risks of frost have disappeared in late spring, it is merely a matter of dispensing with artificial heat, and maintaining a growing atmosphere by damping, shading and ventilation. Once we can rely upon natural warmth we need not worry about temperatures—the maintenance of correct atmospheric conditions will then be our chief concern, and an experienced man will know instinctively upon entering the house if things are as they should be. Always remember that, in the main, Cymbidiums are cool-growing Orchids, and when 20° of frost are registered outside, an inside early morning reading of 40° would be safe if the plants were dry at their roots and the atmosphere not overcharged with moisture. Better to allow this low reading inside, when the weather is exceptionally severe, than to run risk of over-straining the boilers.

Ventilation.—This is a very important factor, and no hard and fast rule can be laid down on the subject. During cold weather, very little air will be needed, especially if a high wind is blowing at the same time. But when the weather is mild and calm just a little top air may be very helpful. In the warmer seasons an abundance of air should be afforded them, but not in sufficient volume to make the house arid and devoid of moisture. Following the early morning damping only a little air will suffice for an hour or two, increasing the amount as the sun rises higher. Never close the ventilators completely if it is likely to cause close and unduly warm atmosphere inside, for the plants very much resent such conditions.

Shading.—Blinds afford the best means of shading these plants, but for ten years I have grown them here with nothing but a permanent shading painted on to the roof of glass and side lights. Ordinary distemper has been used with quite good results, but I shall be glad when the time comes for us to fix new blinds to the houses.

When blinds are in use, these should be lowered fairly early in the morning when the weather is sunny and warm, and allowed to remain down until the raising of them would cause no undue rise in the temperatures. Very much depends upon locality, site and the kind of structure. From early spring until late autumn it will be necessary to shade the foliage from bright sunshine, but admitting plenty of light when the weather is not so clear.

Damping.—During the winter months, especially when the weather is very cold, not much damping in between the plants' pots will be necessary, but the moisture stages should be hosed occasionally for these will dry out fairly rapidly on account of the heat in the pipes at such times. But when the season changes and warm weather arrives, several dampings per day will be needed, for a moist atmosphere is essential. Heavy spraying of the foliage, too, will be necessary during the period mid-spring—mid-autumn, but one must not overdo this if the weather is unfavourable. Cool, moist conditions should be ensured for the night, but no excess of atmospheric moisture must be present when the climatic conditions are bad.

Present-day hybrids.—We have seen some very fine hybrids shown during recent years, and we have had a fair share at Exbury, from which none, however, were shown during the war period. The first outstanding batch of seedlings was raised by crossing *C. Alexanderi*, var. ' magnolia ' with *C.* ' Rosanna,' var. ' Pinkie.' These were all finely coloured hybrids, and the cross was given the name ' Balkis.' *C.* ' Balkis ' F.C.C. variety and *C.* ' Balkis ' A.M. variety were two very fine Orchids indeed. Some years later we used the same ' Rosanna ' on to *Alexanderi*, Westonbirt variety and these, without exception came white with pinkish lips. I have one plant here very fine indeed, but it has never been shown. One day I hope the plant will grow better and give a spike worthy of the highest award. I think it will.

Early last year three fine hybrids were shown from Exbury, namely *C.* ' Nathaniel,' F.C.C. variety, *C.* ' Nimrod,' A.M. variety and *C.* ' Nam Khan,' F.C.C. variety. These to me and many others were outstanding. *C.* ' Nathaniel ' was raised by crossing *C. Pauwelsii* var. ' Comte d'Hemptinne ' with *C.* ' Caer Brito.' The same variety of *C. Pauwelsii* was used in each of the other two instances, *C.* ' Adelma ' var. ' Springtime ' being used to bring *C.* ' Nimrod,' and *C.* ' Rosanna ' var. ' Pinkie ' to produce *C.* ' Nam Khan.' The three of them were all very fine, and I hope to see *C.* ' Nimrod ' get a first-class Certificate before many years. At the moment it is broken up in order to obtain duplicate plants. Finally, as was seen at the R.H.S. Hall on April 29 of this year, we had *C.* ' Swallow,' Exbury variety (Figs. 124 and 125). This received an Award of Merit in 1935. During the war years I could see that the plant could be grown into a finely shaped specimen, so potted it on several occasions. This year it carried five fine spikes with an aggregate of 41 flowers. A grand yellow, and of fine shape and habit. It was gratifying to me to learn that it had been given a first-class Certificate and also the Silver Lindley Medal. Since then the plant has been broken up, so we start all over again. But this variety has wonderful vigour, as can be seen by the photograph.

As far as Exbury-raised seedling Cymbidiums are concerned *C. Pauwelsii* var. 'Comte d'Hemptinne,' *C.* 'Rosanna' var. 'Pinkie' and *C. Alexanderi*, Westonbirt variety have produced some wonderfully fine hybrids, and the first named parent gives wonderful vigour and graceful habit to nearly all its progeny. It remains to be seen what results *C.* 'Balkis' ('Rosanna' × *Alexanderi*) will give in the future. Possibly it may prove that *C.* 'Balkis' will more than hold its own with any hybrids derived from its use. If so, its case will be similar to that of *C.* 'Flamingo' (*Alexanderi* × 'Merlin'), raised at Westonbirt a number of years ago. Mr. ROTHSCHILD bought a plant of the best variety of this hybrid soon after we began to raise Cymbidium seedlings at Exbury, and we used its pollen in a number of cases. But apart from *C.* 'Rhoda,' A.M. variety ('*Pauwelsii*' × 'Flamingo') we have not gone ahead of *C.* 'Flamingo,' in so far as fine lips of that type are concerned (Fig. 126).

Young Seedlings.—Until these young plants reach a size making them suitable to be potted in, say, 4-inch pots, I think they grow best in a smallish house. They need to be kept somewhat warmer than the adult plants, and thrive wonderfully well if kept in a temperature high enough to make overhead spraying safe and profitable nearly all the year round. I feel certain we gain time by doing this in much the same way as we do if we put small propagated pieces in a warmer house after they have been cut away from the main part of large plants.

Life of the Flowers.—The lasting qualities of the flowers are truly amazing. It is no exaggeration to say that the spikes of bloom will remain perfectly fresh for two months or more, especially if one is able, completely to control the atmospheric conditions of the house in which the plants are grown. In a cut state too, they last for a very considerable time, hence their value commercially. I well remember Chelsea Show of 1935. It was originally intended to put up a miscellaneous group, but round about mid-March Mr. ROTHSCHILD made up his mind to show Cymbidiums only, provided I could guarantee that I could fill the allotted space with this genus. After some hesitation I committed myself and said we could do it. (In those days we had every facility for such "experiments.") Eventually, a Gold Medal group of Cymbidiums at Chelsea Show had been staged. I had a certain amount of satisfaction as a result of this, because some of the plants in that group were in flower at Exbury late in February. When I knew they might be needed as a result of the desire to show a purely Cymbidium group they were kept under a dense shade, given much air (when practicable), and kept in a moist atmosphere when a certain amount of air was kept on nearly all the time. As the time for showing approached, however, we had to be very careful not to keep the plants very moist at their roots, for the flowers had been fully developed for a long time, and any excess of root-moisture, I felt, would tend to shorten their life. Plenty of air, shade and atmospheric moisture compensated, in the latter stages, for the restriction of root moisture.

Seed-pods.—In some establishments, quite a large number of these pods fail to give any fertile seeds. There are several reasons, of course, of failure, but the one reason which, to me, has always been outstanding, is the treatment of the plants immediately after the blooms have been fertilized—and throughout the pod-bearing period, of course. At Exbury we have lost very few pods indeed. Once a plant has been used for this purpose it is given special attention. I feel convinced that it is necessary to protect them from over-dryness at their roots and also to keep strong light away from the pods. If the stem bearing the pod becomes " hard " from excessive dryness or any other cause, I think our chances of success lessen at once. The plants should be kept in a nice shady spot and never allowed to become over-dry at their roots.

Early-flowering Cymbidiums.—Several years before the war we raised, at Exbury, *C.* ' Joan,' the result of crossing *C.* ' Doris ' with the old species *C. giganteum.* These seedlings began to flower in September and early October, but my employer did not care for them, and they were disposed of. However, the habit of the spike was good, and, maybe, one day *C.* ' Joan ' may prove to be a valuable parent if early-flowering hybrids are desired.

Later, we crossed *C. Alexanderi* with *C. Finlaysonianum,* which is a summer-flowering species and a native of Malaya. It produces racemes 2 to 4 feet long, and is pendent in habit. We believed we had raised an early-autumn flowering Cymbidium. But although we have a number of healthy seedlings, 11 years old, so far not one has flowered.

Insect Pests.—As a general rule, Cymbidiums are not very susceptible to attacks by the ordinary pests which often infest other Orchids. However, thrips, scales and red spider are apt to put in an appearance if the temperatures and atmospheric conditions are not kept to the plant's liking. Thrips, for instance, sometimes attack the tender young growths of small seedlings, and this usually indicates the plants are either grown somewhat too warm, subjected to unduly strong light or kept too dry. These young seedlings should be kept in a moist atmosphere and sprayed overhead occasionally with a mild solution of nicotine insecticide. The same pest also attacks developing flower-spikes if atmospheric conditions are at fault. During the period that these spikes are developing they, too, should be given a bi-weekly spraying with this insecticide, and if this is done the blooms will be quite free from blemish when they open, provided they are protected from strong light during spring.

Red spider comes as a result of dry arid conditions, and during the period when the plants are in full growth the foliage should be well syringed with clean, soft water every day when the sun shines brightly and the day is warm. Scales appear on the leaves and pseudo-bulbs rapidly if the plants are grown under unduly cool and lifeless atmospheric conditions. Plenty of light is needed for plants of adult size, though shading must be adequate during mid-spring—late autumn.

Provided the house is correctly ventilated, heated and shaded according to the season, Cymbidiums keep fairly free from these pests, but if red spider or scales are present the plants should be cleaned by sponging them with a mild solution of Volck insecticide, using one part of this to three hundred parts clean, soft water. An occasional overhead spraying with this insecticide at this strength will usually prevent these pests from commencing an attack, but one must be very careful when using this Volck. After treatment with it, the plants should receive extra and earlier shading for a day or two, and then the operation will be safe and successful. On no account use this insecticide stronger than advised above—one part to three hundred is safe and also effective.

NOTES FROM FELLOWS

Some small-growing Kniphofias

SEVERAL of the dwarf species of Torch Lilies play an important rôle in the late Summer and Autumn in the rock garden where they appreciate good drainage and fairly rich soil. Although a good many species have been introduced from South Africa and Abyssinia in the last fifty years, only a few have really established themselves in cultivation. *K. Galpinii* has proved one of the most valuable introductions, not only for the beauty of its orange spires of bloom but for its readiness to cross with the large numbers of the genus—in fact, I have had difficulty in keeping *K. Galpinii* in its pure state. From a batch of seedlings raised some years ago I had a great variety of shades of orange, lemon and even a white form; the best of these seedlings is a very showy orange form of medium height which makes a wonderful display in October, being exceptionally free flowering. It has very narrow bright green leaves and has been named 'Underway.' *K. Nelsonii* is similar in habit to *K. Galpinii* but is much redder and has a thinner spike of flowers. It flourished here at one time, but has died out during the war. A very charming little Kniphofia came to me as "*K. minima*," a name lacking authority but aptly suiting the plant which flowers in September, eighteen-inch spikes of tawny orange rising from a mound of grassy foliage.

Two charming lemon-yellow species are *K. pauciflora* and *K. rufa*, late summer flowering but not very hardy I fear. The very attractive white flowered *K. insignis* is unfortunately one of the more tender species, but I have seen it growing well at Kew under a greenhouse wall. In common with other completely deciduous species, it is easily protected with a cloche in winter. *K. comosa* is an Abyssinian plant which stands up to a considerable amount of frost when grown in an open well-drained position; it is most attractive with a stem 2 to 3 feet tall bearing a large head of orange flowers nearly smothered by the long crimson stamens giving it the appearance of a Callistemon. So far as I know *K. comosa* does not hybridize with other species; it is rather a shy seeder (Fig. 129).

K. Snowdenii was introduced about thirty years ago from Mount Elgon, but has proved more tender than was expected from that altitude. The main crown is easily destroyed by a hard frost, though numerous small shoots reappear from the roots and will flower in a few years. The flowers are more sparsely placed on the stem than in most Kniphofias so that it looks not unlike a Lachenalia when in bloom (Fig. 128).

Perhaps the most charming Kniphofia with which I am acquainted is so far unnamed. Seed was sent to me by Captain ERSKINE of Gore, Western Abyssinia, shortly before the war and about half a dozen plants were raised. From a rather small crown of soft green leaves a flower stem is sent up in October to a height of 5 feet, bearing a head of orange or salmon-tinted curved cylindrical flowers (it seems very variable) which open from the top of the stem downwards. Flowering so late in the year it only occasionally manages to ripen seed, but I have divided it successfully in spring, and the plants have survived the rigours of the 1946–47 winter in the open border.

West Porlock, Somerset. N. G. HADDEN.

Magnolia Veitchii

The photographs of *Magnolia Veitchii* Bean were taken at Casewick in Lincolnshire on May 5, 1947, one of the coldest counties and after a record winter (Fig. 127).

Messrs VEITCH are to be congratulated upon raising one of the most beautiful deciduous Magnolias, and one that is perfectly hardy, and flowers profusely in the colder parts of Britain. Its hardiness is the more remarkable when one remembers that its parents are M. *conspicua* and *M. Campbellii*, the latter flowering only in favourable seasons in the extreme S.W. of England.

The *Magnolia Veitchii* in the illustrations was planted—4 feet high—in 1930, and has now grown into a shapely tree 32 feet in height. For the first ten years it grew rapidly and flowered sparsely ; now it flowers annually on every lead.

Magnolia Veitchii is tolerant of any soil—this is Oxford Clay—and will certainly make a tree of 40 feet, perhaps more in sheltered situations. Some windbreak is essential ; the immense flowers and the heavy foliage catch the wind and the branches may be damaged by summer storms.

When in full foliage the tree somewhat resembles the Cucumber tree (*M. acuminata*), though the leaves are somewhat tinted with bronze. *Magnolia Veitchii* is fully deciduous, and in winter will stand gales, snow and frost, with the temperature down to zero.

Colonel F. D. TROLLOPE-BELLEW,
D.S.O., O.B.E., M.C.

ADDENDUM

Walnuts in England (July Journal).

We have been asked to add that the Walnuts in Fig. 110 should be identified as follows :

Lowest row. ' Franquette ' on the right and ' Mayette ' on the left.

BOOK NOTES

" Gall Midges of Economic Importance." H. F. Barnes. Vol. 1. " Gall Midges of Root and Vegetable Crops." 104 pp. and 10 plates. 12*s*. 6*d*. net. Vol. 2. " Gall Midges of Fodder Crops. Pp. 160 and 4 plates. 15*s*. net. (Messrs. Crosby Lockwood & Son, Ltd. 1946.)

The appearance of a monograph dealing with a particular family of insects may call for little comment so far as the agricultural and horticultural community is concerned, but the publication of one such work relating to a family economically so important as the Cecidomyidae or Gall Midges, and written by so eminent a world authority as Dr. Barnes, deserves special notice.

The complete work will comprise eight volumes, each of which will deal with the Gall Midges of various groups of crops and, in addition, with those species that live either in fungi and in decaying organic matter or that prey upon other insects and on mites.

The first two volumes have been published, and deal respectively with the midges of root and vegetable crops and the midges of fodder crops.

It is strange that so little is known of this family of small Dipterous insects, and this despite the serious losses caused by many species, including the Hessian Fy, the Grass and Clover Seed Midges, and the Swede, Pear, Chrysanthemum and Violet Gall Midges.

Previous monographs on the family have been prepared by such world-famous specialists as Kieffer, Rübsaamen and Tavares in Europe, and numerous monographic and economic papers published in the United States of America by Felt, but no comprehensive work on the Gall Midges of economic importance has until now been published.

The author took upon himself the immense task of consulting the world literature on the subject, of building-up an unique collection of specimens from all parts of the globe, of conducting investigations at Rothamsted on the host range of many species, of studying the factors affecting fluctuations in populations, and of working out the life cycles of numerous Gall Midges under both natural and controlled conditions.

Each of the present two volumes opens with a list of the crops, arranged alphabetically, indicating the species of midges that attack each crop, the part of the plant injured by the larvae and the symptoms of attack, together with paragraphs relating to the distribution, life history, natural enemies, and preventive and remedial measures. Stress is laid throughout on the biology and control—these factors alone widening the scope of interest to the practical grower and the layman.

This group of plant pests is one that is difficult to control directly by means of chemical methods (sprays and dusts), and the grower has to depend largely upon cultural measures, including the arrangement of dates of sowing and/or harvesting, crop rotational practices and similar measures to allow the crop to escape the peak emergence period of the particular Gall Midge. Such recommendations as are made in the text are the outcome of the most exhaustive investigations on the several life cycles and habits of Gall Midges contributed by the author and other applied biologists. The result of neglect of this important group of plant pests is indicated by the scanty information on the control of many species of midges.

The two volumes are packed with detailed information of available knowledge, and should stimulate plant pathologists to further efforts on the family and its relation to food and ornamental crops.

It is hoped that in the second edition of these volumes there will appear many more illustrations of injury to plants, for the benefit of growers whose recognition of a pest on their crops is from the signs of attack, and the visual aid to recognition far outweighs the written word.

The wide scope covered by these volumes should result in a demand for them by growers and planters throughout the English-speaking world, while entomologists in all countries will welcome the appearance of this comprehensive work.

G. F. W.

" Forestry Practice." Bulletin No. 14 of the Forestry Commission. (H.M.S.O.) 2*s*.

This bulletin should be in the library of all those concerned with forestry, both as students and as estate managers. It is thoroughly practical and contains a summary of modern methods of establishing forest nurseries and plantations together with advice on the choice of species for different habitats, on diseases, marketing and finally on the financial aspect and the scheme for the dedication of woodlands.

" Root Vegetables." Bulletin No. 120 Ministry of Agriculture. (H.M.S.O.) Illus. 9*d*.

This bulletin has been recently revised and brought up to date by a specialist committee under Mr. F. Secrett. It should be valuable both to the large grower and the beginner growing his own vegetables for the first time.

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JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

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THE SECRETARY'S PAGE

Programme of Meetings.—The following Meetings with Shows will be held during the months of September and October :—

Tuesday, September 9—12 noon to 6 P.M.
Wednesday, September 10—10 A.M. to 5 P.M.
Tuesday, September 23—12 noon to 6 P.M.
Wednesday, September 24—10 A.M. to 5 P.M.
Tuesday, October 7—12.30 P.M. to 6 P.M.
Wednesday, October 8—10 A.M. to 5 P.M.
Tuesday, October 21—12 noon to 6 P.M.
Wednesday, October 22—10 A.M. to 5 P.M.

At the Show on September 9 and 10 the Old Hall will be occupied by an Exhibition of Municipal Horticulture, which will be formally opened at 11.30 A.M. on Tuesday, September 9, by Mr. JOHN EDWARDS, Parliamentary Secretary, Ministry of Health.

Competitions.—There will be three competitions for amateurs at the Show on September 9 and 10, a Cactus and Succulent Competition, a Plum Competition and a Flower Arrangement Competition. In connection with the Autumn Fruit and Vegetable Show on October 7 and 8 there will be a Flower Arrangement Competition for professional florists. Particulars of these competitions may be obtained from The Secretary, Royal Horticultural Society, Vincent Square, S.W. 1.

In conjunction with the Show on September 9 and 10 the Alpine Garden Society will hold competitions, particulars of which may be obtained on application to the Secretary of the Alpine Garden Society, Mr. C. B. SAUNDERS, Husseys, Green Street Green, Farnborough, Kent.

Conference on Municipal Horticulture.—There will be a conference on Municipal Horticulture in the Lecture Room of the New Hall at 3 P.M. on Tuesday, September 9, at which the opening speaker will be Mr. J. RICHARDSON, Director of Parks, Manchester.

Lectures.—The following lectures will be held during September and October :—

September 23—"The Weather and Plant Disorders," by Mr. D. GREEN, of the Society's Gardens at Wisley.

October 7—"Fruit Growers' Pitfalls," by Mr. R. BUSH.

These lectures will take place at 3 P.M. in the Lecture Room of the New Hall, Greycoat Street, S.W. 1.

The lecture which was scheduled for September 23, by Mr. M. B. Crane, F.R.S., has been unavoidably postponed.

Demonstrations at Wisley.—The following demonstrations will be held at Wisley during September and October :—

Vegetable Garden

Wednesday and Thursday, September 17 and 18.—Harvesting and Storing. (2 to 4 P.M.)

Wednesday and Thursday, October 8 and 9.—Digging, Trenching, Manuring and Composting. (2 to 4 P.M.)

In both cases the demonstration given on the second day will be a repetition of that given on the first.

Kindred Societies' Show.—The National Dahlia Society is holding a Show in the New Hall on Thursday and Friday, September 4 (12 noon to 7.30 P.M.) and September 5 (10 A.M. to 5 P.M.). The admission charge to non-members of the National Dahlia Society will be 2*s.* 6*d.* on the first day until 5 P.M., and 1*s.* from 5 P.M. to 7.30 P.M., and 1*s.* on the second day. Our Fellows' and Associates' tickets will admit to this Show.

The National Chrysanthemum Society will hold a Show in the New Hall on Tuesday, September 16, and it will be open to the public from 1 P.M. to 8 P.M. at an admission charge of 2*s.* 6*d.* On Friday, September 19, there will be a Show in the New Hall organised by the National Rose Society, which will be open to the public from 12 noon to 5.30 P.M. Admission will cost 3*s.* 6*d.* from noon to 4 o'clock, and 2*s.* 6*d.* from then onwards. Our Fellows' and Associates' tickets will not admit to either of these Shows, but admission may be obtained on payment at the door.

R.A.F. Horticultural Show.—The Royal Air Force will be holding a Show in the Society's New Hall on Wednesday, October 1, which will be open to Fellows, Associates and the public from 2 P.M. until 6 P.M. There will be no charge for admission.

Examinations for the National Diploma in Horticulture.—The written parts of the Examinations for the National Diploma in Horticulture were held in April and the practical parts were held in June and July.

At the Preliminary Examination there were 99 candidates, of whom 34 satisfied the examiners that they should be allowed to proceed to the Final Examination if or when they have been engaged in horticulture for the requisite six years.

Sixty-two candidates presented themselves for the various Sections of the Final Examination and the National Diploma has been awarded to twenty-two of them as follows :—

Section 2—Fruits in the open

Miss L. R. E. MARTIN

Section 3—Vegetables in the open

Miss M. H. CLULEY	Mr. W. HEYDECKER

Section 5—General Horticulture

Mr. G. E. BROWN	Mr. J. F. HAYDEN
Mr. P. CLARKE	Mr. C. H. HENNING
Miss R. A. DOBEREINER	Mr. E. E. KEMP
Mr. H. J. EATON	Mr. B. A. LOVATT
Miss K. EPERON	Miss Y. S. KINGSLEY WARD
Mr. J. P. FANNING	Miss M. J. WATKINS
Mr. N. D. GOODWAY	Mr. R. H. WILDY

Section 7—Landscape Architecture

Mr. E. J. WINTON

Section 8—Public Parks, Grounds and Open Spaces

Mr. T. L. ASHTON	Mr. J. W. L. STACEY
Mr. R. O. STANION	Mr. M. J. WILLIAMS

WISLEY IN SEPTEMBER

THIS month will see the marks of autumn appearing in the Gardens—slowly at first, but later with increasing rapidity until each section has coloured foliage and ripe fruit to show as a reminder that winter is near.

Few plants will be found in flower amongst the general shrub collection at this season and the chief centres of interest are the extensive trial of Dahlias by the grass walk leading to Battleston Hill and the collection of early flowering Chrysanthemums, both disbudded and spray types, in the adjacent beds; also near at hand will be found the trial of Michaelmas Daisies and the dwarfer *Aster Amellus* hybrids. Judgment of varieties growing in the trials is a much more reliable method of choosing plants for the garden than selection from those exhibited on the show bench. New varieties of both Dahlias and Chrysanthemums are introduced every year, and by growing these in conjunction with older and tried varieties, it is possible to retain the best of both old and new.

Passing from the Floral Trial Grounds, we ascend the hill between the two long beds of roses, now well into their second flush of blossom, and we may note the varieties giving the best autumn display, before making a quick inspection of the annual border near which the collection of French and African Marigolds still provides a gold and orange carpet amongst the Pear trees. Unfortunately an unprecedented storm in July of four inches of rain and hail in one and a half hours did much damage to the Annuals and other herbaceous plants in the Gardens, so that the Annual Border will not be as good as it was last year.

The Alpine House, if no longer filled with flowers, will still show attractive pans of the late-flowering Campanulas, while the small Sea Lavender *Limonium* (*Statice*) *cosyrense* and the grey-leaved *Helichrysum frigidum*, a native of Corsica, will also be in flower. In the neighbouring outside beds, the first Crocus species will be in bloom, particularly *C. nudiflorus*, soon followed by *C. zonatus* and *C. speciosus ;* in other beds will be seen the collection of *Gazanias* with their brilliantly coloured yellow and orange flowers with black markings, and near these a mixed planting of *Salvia caerulea* with dark blue flowers, and the golden-yellow *Hypericum* ' Rowallane Hybrid ' form one of the most effective late summer beds in the Gardens, giving a good display of flowers until hard frost intervenes in October. Both these plants survived last winter in these beds with only a thin layer of bracken for protection, and they are probably hardier than was previously thought.

The Rock Garden is dotted with late-flowering Gentians, while *G. asclepiadea*, the Willow Gentian, has sown itself freely both here and in the Wild Garden. Along the top walk we find *G. sino-ornata*, probably the best of its class, with *G. Macaulayi* and *G. Farreri* and the blue of *Cyananthus microphyllus* and *C. Sherriffii* noted last month. Amongst the last plants to flower will be found the Polygonums, particularly *P. affine* and *P. vacciniifolium*, the latter a low-growing shrub with freely produced spikes of pink flowers and pleasing autumn colours in its small leaves. A less common species is *P. Reynoutria*, a small bush about eighteen inches high with inconspicuous flowers followed by very pleasing crimson fruiting sprays ; *P. capitatum* is a more widely grown plant whose bronze tinted sprays terminate in globular, mauve flower-heads.

The Wild Garden contains few flowers other than the naturalized Willow Gentian and beds of *Gentiana sino-ornata*, but one eastern American shrub *Cyrilla racemiflora* is hung with white sprays, and the first autumn colours are appearing on *Enkianthus perulatus* and *Disanthus cercidifolius*, both of which will be completely clothed in scarlet and crimson towards the end of the month. Coloured fruits will be seen on some of the *Gaultherias* and *Vacciniums*, and beneath the larger conifers the first flowers of *Cyclamen neapolitanum*, in both its pink and white forms, will be appearing in advance of their foliage.

Passing from here into the Heath Garden, we see that most of the Ericas noted last month are still in flower, among which *E. vagans* var. ' Mrs. Maxwell ' and *Calluna vulgaris* var. ' H. E. Beale ' are outstanding ; while in Seven Acres many of the early Berberis are already hung with ripe fruit and the Cotoneasters are also beginning to colour. Few flowers remain except the purple spikes of *Buddleia Fallowiana* and *B. Davidii* and one or two Hypericums such as *H. prolificum* still carry a sprinkling of golden blossoms. Autumn tints will be seen in the foliage of *Ribes aureum*, *Acer circinatum* and several *Malus*, while a number of *Euonymus* species are outstanding, every leaf turning to pink or crimson and making a brilliant display until the high winds of autumn scatter their beauty.

In Howard's Field, the many Rose species are laden with ripe or coloured fruits in a variety of shapes and shades. Returning by the herbaceous borders, which remind us at this season of the autumn and approaching winter with their display of Asters and Solidagos, two plants call for attention, the neat-growing purple *Physostegia virginiana* var. 'Vivid,' and the pale pink *Chrysanthemum rubellum*, while *Anemone japonica* in many varieties is too well known to need comment to enhance its value as a September flower.

In the Azalea Garden, the collection of *Colchicum* hybrids will be in flower during the latter part of the month, while many of the Viburnums in the neighbouring beds will be hung with scarlet fruits.

The Greenhouses become increasingly interesting with the shorter days; in the Temperate House many plants previously noted are still in bloom including *Cestrum aurantiacum* and *Plumbago capensis*; also planted on the centre bed is *Tibouchina semidecandra* which produces a long succession of deep purple flowers enhanced by the faint silvering of the young foliage. Here also is the golden-flowered *Cassia corymbosa* and the red *Malva umbellata*. The Half Hardy House has several bulbous plants in flower, prominent amongst these being the early Nerines in shades of pink and red, the 'Scarborough Lily,' *Vallota purpurea*, a popular cottage window plant, and *Acidanthera bicolor* var. *Murielae*, a native of Abyssinia with delightfully perfumed, white, gladiolus-like flowers, marked with a crimson blotch at the base of the petals. Two plants which have been flowering here for many months are *Diplacus glutinosu* sand *Sphaeralcea Fendleri*; both survived the winter with the minimum of protection and flower continuously throughout the summer months. They are easily-grown subjects for a cool conservatory; the *Diplacus* occurs in both white and crimson forms in addition to the more usual buff type seen here.

Round the walls of the Laboratory, the large plant of *Cotoneaster horizontalis* is covered in red berries, *Campsis* (*Tecoma*) *grandiflora* carries its brick-red trumpets over the archway at the north end, and beyond this a small tree of *Clerodendron trichotomum* bears a cluster of fragrant creamy flowers at the end of every branchlet.

The Vegetable Trials in Wisley village contain many trials of interest reaching maturity this month, including Runner Beans, Autumn Cabbage, Celery and Vegetable Marrows, while the outdoor Tomatoes mentioned last month are well worth further inspection. Intending visitors to the vegetable grounds should note that they are open only from 9 A.M. to 5 P.M. each weekday (Saturdays 9 A.M. to 12 NOON); they are closed on Sundays.

MASTERS MEMORIAL LECTURES, 1947

GROWTH REGULATING SUBSTANCES IN HORTICULTURE

By Thomas Swarbrick, M.Sc., Ph.D.

PART II

(Dr. J. Ramsbottom, O.B.E., D.Sc., F.L.S., *in the Chair*)

PRESENT-DAY plant physiological theory assumes that the shape and arrangement of organs such as leaves and shoots is determined by the presence or absence of certain chemical substances, known as growth regulators. Experiment shows that the meristematic regions of the plant are the most important centres for the production of these substances, although present knowledge does not enable us to say whether they are the result of primary synthesis or the degradation products of metabolism.

The author's interest in growth regulating substances dates from 1928 when it was shown that by removing the buds from one-year Apple shoots which were allowed to remain on the tree, the normal sequences of growth were inhibited, despite the fact that normal growth was taking place in the rest of the tree. The disbudded shoots remained "alive" but failed to "grow." Normal growth sequences in such disbudded shoots could be initiated by inserting into them normal developing buds. Such growth sequences were strongly basipetal, that is when a bud was inserted half-way down a shoot, growth development occurred downwards but not upwards. Further work—not yet published—showed that root growth both in length and thickness was determined by the time at which materials arrived in the roots from the above-ground parts of the tree. It was confirmed that the periods of maximum root growth do not coincide with those of stem growth, but as there has been no opportunity to conclude this study it is not possible to define the relative rôles of photo-synthetic growth regulating substances in this connection.

Interest in the subject was further stimulated by the author's work on the normal physiology of fruit trees and the effect of pruning upon the growth, shape and cropping of Apple trees. It was found that the observed phenomena could not be explained without recourse to the theory of growth regulating substances. This led to a critical study of the literature, particularly the work of Loeb, Boysen Jensen, Went, and Hitchcock and Zimmerman. The big problem was how to prevent June drop in Apples, notably 'Cox's Orange Pippin' and eventually work was started in a small way at Long Ashton. Research along similar lines was expanding rapidly in U.S.A., initiated largely by the workers at Boyce Thompson, but fostered and encouraged by the more important chemical manufacturers. As we shall see presently, growth regulating substances now take their place along with insecticides and fungicides as aids to commercial fruit growing.

The Production of Seedless Fruits

Any means of producing seedless fruit of good edible and storage quality has almost unlimited economic possibilities. It is not surprising, therefore, that chemicals which proved physiologically active in other directions should also be tried in this connection. YASUDA appears to have been the first to produce seedless fruits by artificial means. He used Orchid pollen and pollen extracts, applying these to the emasculated flowers of Tomato and Cucumber. Although it is not certain, the active substance in the pollen extract was probably beta-indole acetic acid. GUSTAFSON and others incorporated synthetic substances such as indole acetic and alpha-naphthalene acetic acids in lanolin and applied this mixture to the decapitated stigmas of Tomato, Cucumber, Egg Plant and Pepper and succeeded in inducing the development of seedless fruit. GARDNER and MARTH introduced the spraying method which is most commonly used now. More recently these substances have been applied as "aerosols" and "vapours." These methods are certainly quick and simple, but cannot yet be recommended for use on a commercial scale, because we do not have substances with a sufficiently wide range of effective concentration. Substances that can be applied directly to the flower trusses and thereby induce the development of seedless fruits may cause undesirable effects if applied to the plant as a whole. Whole plants have been treated satisfactorily under experimental conditions, but the author is not prepared to recommend this method at present.

In 1944 HITCHCOCK and ZIMMERMAN listed thirty-one substances, mostly substitution products of phenoxy-acids, which had been found effective in varying degrees. Of these only alpha-naphthalene acetic acid, beta-naphthoxy-acetic acid, 3 indole compounds and 2,4-dichlorophenoxyacetic acid and 4-chlorophenoxyacetic acid can be used in practice. Even these materials are highly specific and have critical concentrations in relation to various plant species, so that care is needed in formulating them for use on a commercial scale. Thus, alpha-naphthalene acetic acid is the most effective substance for inducing the parthenocarpic development of Holly berries. Indeed Holly is extremely sensitive to this chemical, so that a complete "set" of Holly berries can be obtained by spraying the open flowers at 10-15 ppm. Yet this material is almost without effect upon the Tomato. Indole acetic acid will induce seedless fruits in a wide range of plants, but must be used at concentrations up to 1000 ppm. In U.S.A. commercial preparations are on the market, based upon indole acetic or butyric acid, but these substances cannot be used in England owing to their phenomenally high price. In contrast, 2–4 D will induce the development of seedless fruits in a number of species at concentrations as low as 2–5 ppm. Furthermore 2–4 D is cheap and relatively easy to make. But it has a very small range in its effective concentration and when used above this amount may induce very undesirable results which will be described in detail a little later. In consequence it is difficult to formulate a safe commercial product based on 2–4 D. 4-chlorophenoxyacetic acid is another substance that is known to be effective at low concentration and is included in some of the better formulations now being marketed.

Thus, of the thirty-one substances listed by HITCHCOCK and ZIMMERMAN, only beta-naphthoxyacetic acid, indole acetic acid and 4-chlorophenoxyacetic acid have the necessary qualities which enable them to be used on a commercial scale. Obviously other materials, or combinations of materials, are effective and may be used, but only after exhaustive trial under a wide range of conditions. Recent reports by HOWLETT and MARTH indicate that greenhouse conditions such as relative humidity and temperature will cause standard mixtures of growth regulating substances to exhibit different responses.

The specific effect of these substances has already been mentioned and the following case may be cited. Alpha-naphthalene acetic acid when applied to emasculated Tomato flowers will induce fruits to " set " but they will not develop to commercial size, although they will ripen in the normal way. Beta-naphthoxyacetic acid, on the other hand, will induce them both to " set " and " develop." A similar phenomenon has been observed in Apples and Pears. For several years the author has been able to " set " Apples and Pears in large numbers, but they have never developed to commercial size. Only in 1945 after the severe frost was this accomplished, and then only by using a " mixture " of growth substances based on their respective individual properties. Tomato pollen extract was found to be highly effective in inducing seedless fruit development in this species and Dr. LUCKWELL is now following up this line at Long Ashton and has shown that an active growth regulating substance can be extracted from young developing Apple seeds. These observations are of both practical and theoretical importance. From the theoretical standpoint it should be possible to extract substances that will affect the cell enlargement as distinct from the cell division stage of fruit growth. Indeed we have indications already that 2–4 D will do this in Tomatoes and that 4-chlorophenoxyacetic acid will do it in the case of Blackberries.

One of the most recent and spectacular applications of chemicals to the production of seedless fruit on a large scale is that reported by OVERBEEK on Pineapples. By using 2–4 D and alpha-naphthalene acetic acid OVERBEEK has succeeded in inducing the flowering and fruiting of Pineapples at all times of the year in varieties which normally are difficult to get into bearing. The procedure is simple. The plants are encouraged to grow until they have produced sufficient leaves to support and mature a good-sized fruit. Incidentally, OVERBEEK has worked out in detail the relationship between leaf area and fruit size so that fruits of any given size can be produced by timing the application of the growth regulating substance. A solution of alpha-naphthalene acetic acid is made up and a few drops are placed into the tip of each plant. One ounce of substance is sufficient to treat 113,000 plants.

By this method a complete control is obtained over the time of cropping and the average size of the fruits. Successional cropping can be obtained over the whole twelve months and peak-periods in Pineapple harvesting and processing can be completely eliminated. In addition the " slip " formation, that is the material used for propagation may be increased by 70 per cent.

Although not an important crop in England, Grapes rank high in world production and much interest centres round the production of seedless varieties for table use. A large project to breed and develop seedless Grapes of high quality is now under way at Davis, California. Two important aspects of this work should be mentioned in the present connection. The first is that the existing " seedless " varieties, such as ' Thompson's Seedless,' are the result of embryo abortion. Pollination and fertilization take place and an embryo begins to develop, but it aborts at a very early stage. Apparently this small amount of embryo development is sufficient to " set" the fruit and ensure its " development." In this respect they are like the ' Blue Rock Cross Myrobolan ' plums reported by CRANE and BROWN.

The second important point is the apparent relation between seed content and fruit shape. OLMO finds that within a variety the fully seeded grape is round and has a short longitudinal axis. The seedless or partially seeded fruit is elongated. Time does not allow a development of theme, but it was pointed out by SWARBRICK and HINTON that Apple fruits produced at different positions on the same spur were of very different shape and keeping quality. The elongated form of the ' Jaffa ' and ' Washington Navel ' Oranges may also be mentioned in passing. Seed content and shape are obviously linked phenomena.

One of the more significant aspects of the recent work on growth regulating substances is the observation by SWARBRICK that emasculated Tomato flowers may be stimulated into active growth for upwards of three weeks after normal petal fall. Practical Tomato growers who witness this for the first time can scarcely believe what they see. It appears that, in Tomato at any rate, the maternal tissues which ultimately develop as fruits remain receptive to the growth stimulus for a surprisingly long time. This retention of receptivity has considerable theoretic importance since these tissues are meristematic. The practical importance of this observation is obvious. Crops of Tomatoes may be " set " long after the grower has decided that setting has failed. Astonishing and spectacular results can also be obtained by spraying full-grown " sterile Jack " plants. In one case a plant which was 9 feet high and had twelve fully developed flower trusses, all of them without a single developed fruit, when it was given a single spraying treatment yielded almost 12 lb. of ripe fruit at one picking, and incidentally, earned the author the only bet he ever won ! In this case the oldest truss that developed fruits had finished flowering about fifty days prior to the treatment.

The older ones were apparently incapable of stimulation. The theoretical importance of these observations lies in the fact that while waiting for stimulation such tissues are like those of " dormant " buds, a subject that will be discussed in more detail a little later.

The whole of this lecture and several others could be devoted to the several aspects of producing seedless fruits, but mention can only be made of two observations that are worth further study in this connection. Artificial pollination of Apples is practised on a large scale in certain parts of the Pacific North West, and many people are engaged in the collection and distribution of Apple pollen during the flowering season. Since bees are known to collect pollen, and this in turn can be collected from them as they enter the hive, it was thought that this would surely be the best way of obtaining the much-needed pollen, since several pounds a day can be collected at the entrance to a strong hive of bees. But this pollen proved to be completely sterile. It could not be induced to germinate by any known laboratory technique. Further study showed that after a few minutes in the pollen sac the pollen was sterile and would no longer germinate. This raises some fine points for the bee-keepers, entomologists and pomologists, but for us the simple question is by what means and with what substance does the bee so effectively, rapidly, and completely sterilize the pollen it proposes to store in its hive. Such a substance might be just what some of my fruit grower friends want to aid them in controlling biennial bearing in certain varieties of Apples and Plums. Anyway the investigation would be worth it for its own sake.

So far we have discussed the use of growth regulating substances as a means of inducing fruit development without prior pollination and fertilization of the ovaries. But these substances are now being used to increase the effectiveness of normal pollination and fertilization. This application may prove to be economically more important than the production of seedless fruits. It is well known, for example, that in certain so-called incompatible varieties, pollen which will germinate under ordinary conditions fails to do so when placed on the " incompatible " stigmas. If it does germinate the germ tubes grow only a short distance down the style and then die. No explanation for this phenomenon is forthcoming at present and while it would be easy to say that it is due to a growth inhibitor, so far none has been proven. The effectiveness of growth regulating substances as an aid to normal pollination and seed production is demonstrated by the work of WHITAKER and PRYOR. These workers found that although melons set quite freely when pollen is transferred by insects, artificial pollination results in not more than a 33⅓ per cent. set of seeds. If this set could be increased plant breeding work could be greatly facilitated. Attempts to increase the percentage set through the supplemental use of indole acetic, indole propionic and indole butyric acids, naphthalene acetamide, an ether extract of Cantaloup pollen, non-viable pollen in lanolin, alpha-naphthalene acetic acid, beta-naphthoxy-acetic acid and certain of the substituted phenoxy-acetic acids were all uniformly unsuccessful. However, a significant increase in set, from 27 to 59 per cent., was obtained by the use of 4-chloro-phenoxy-acetic acid. This would mean an increase of 22 fruits on every 100 hand pollinations. These results are of universal practical interest to horticulturists generally. In England, growers of ' Cox's Orange Pippin ' Apples and ' Comice ' Pears may one day be supplied with substances which can be applied to their trees in order to make the " natural " pollen much more effective. It will be one of those growth regulating substances of which it can be truly said that " a little goes a long way."

Since I have so far not allowed my fancy to carry me away, may I suggest that insects may have very different values as pollinators, largely due to the substances they secrete or mix with the pollen during its collection and distribution ? Furthermore the value of a particular variety as a pollinator may be directly related to the kind and amount of growth regulating substances contained in its pollen. That it is not due entirely to its chromosome content has already been indicated by CRANE and BROWN, who point out that the pollen of ' Beurré Bedford ' is " abnormal " so far as its chromosomes are concerned ; yet it is a good pollinator in practice. Our whole concept of the value and use of pollinator varieties is due for complete overhaul in the light of recently discovered facts on the influence of growth regulating substances.

The Prevention of Preharvest Fruit Drop

Preharvest fruit drop in Apples and Pears can now be prevented, or delayed, by the application of growth regulating substances. A wide range of materials has been tried both in England and U.S.A., but the alpha-naphthalene and 2-4 D compounds are the only ones usable in practice. The use of 2-4 D is comparatively recent and is not yet established on a commercial basis. Alpha-naphthalene compounds, although effective on most varieties, give very variable results on certain varieties such as ' Ellison's Orange ' and ' McIntosh Red.' It was found that whereas in most varieties the duration of effectiveness extended to a maximum of 21 days, it was not more than five days in ' McIntosh Red.' This led to a search for a material with a longer period of effectiveness, particularly for use on those varieties which did not respond normally to alpha-naphthalene acetic acid. It was already known from previous work that the effective period of alpha-naphthalene acetic acid could be prolonged by a second spraying just before effectiveness was due to run out. It is possible by repeated and properly timed sprayings to retain fruit on the trees until well beyond normal leaf fall. During this period the fruits may be removed at any time by the use of slightly above average force but without undue damage to the spur system. But if two applications are made very close together, *i.e.* at not more than two or three days' interval the effect upon tenacity is additive and the abscission layers may never develop to the stage where the fruit can be removed without undue damage to the tree.

In recent years an intensive study—mainly by United States Government workers at Bellsville—has been made on the effect of

2-4 D on plant meristems, particularly on the development of abscission layers. **Batjer** and **Marth** find that 2-4 D can be used to prevent or delay preharvest fruit drop, but that the critical concentration range is very narrow. But in contrast to alpha-naphthalene acetic acid the duration of its effective period is much longer, and it is effective on the varieties that do not respond to this material. These findings are of practical and theoretical importance since it should be possible to combine the last Codlin moth with the preharvest drop spray and so save one spray application. It is too early as yet to forecast future developments from the academic studies now in progress, but they are sure to lead sooner or later to improved materials and formulations for the prevention of preharvest fruit drop. For example, they have already shown that 2-4 D enters the plant and is translocated much more easily than alpha-naphthalene acetic acid. Some forms of the substance, *e.g.* its amide or nitrile, may be even more "mobile" and may on this account be expected to be effective at lower concentrations.

The most important practical development in recent years is in the method of application. In U.S.A. preharvest drop sprays are now applied mainly as "aerosols" dispersed by aeroplane. The active material is made up into a concentrate, usually by solutizing it in a high grade petroleum spray oil. This is then applied either directly at the rate of 3-5 gallons per acre or as a concentrated emulsion at 8-10 gallons per acre. In either case the active material is incorporated in petroleum oil which is then dispersed as very fine air-borne particles which float about the orchard as a mist. By this method the effectiveness of the materials has been stepped up so that adequate control is now obtained using only 15 grams of substance per acre instead of 48-50 grams when a water-based conventional spray is used.

It remains now to mention the effect of preharvest drop sprays on fruit ripening storage life and quality. The materials used to delay the development of abscission layers do not slow down the normal ripening processes. Indeed rather the reverse. Fruits treated with 2-4 D or alpha-naphthalene acetic acid to prevent preharvest drop have a higher rate of respiration when they are picked than untreated fruits, and in consequence tend to come to their climacteric in a shorter period of time. Serious complications may therefore arise if treated and non-treated fruit are mixed and stored together, particularly if the fruit is allowed to become tree-ripe prior to picking. This problem did not arise in the past because growers have always picked their fruit on the under-ripe side owing to fear of excessive drop, but now that they use preharvest drop sprays they tend to leave the fruit on the tree until it is over-ripe, at least for prolonged storage. This is particularly the case with Pears. The problem is being overcome in U.S.A. by the use of pressure testers, which are standardized instruments by which the growers determine the exact stage at which to pick their fruit for any particular purpose, *e.g.* prolonged cold storage, immediate processing, or for pre-cooling and shipment to Eastern or European markets. This is certainly the application of science to the production and marketing of agricultural products on a vast scale.

Root Growth

Since a lot has already been written about the use of these substances in the rooting of plant material, I will confine myself to some of the less well-known aspects of the problem. Many substances will induce rooting and although some, such as alpha-naphthalene acetic acid and 2-4 D, have very narrow critical concentrations particularly in relation to certain species, most of the substances are very accommodating in this respect. Thus phenyl acetic acid and the indole compounds will induce more or less normal root development on a wide range of plants over a wide range of concentration. Some plants, Ilex for example, respond particularly to one substance, in this case alpha-naphthalene acetic acid.

The chemical aspects of this problem are interesting. Phenoxy acid, for example, is practically inactive so far as its ability to initiate roots is concerned, yet it can be rendered highly active by introducing one or more substitutions into the nucleus, particularly if these substances are halogens. This effect may be further heightened by lengthening the side chain; *e.g.*, 2,4-dichlorophenoxy-propionic acid may be 30 times more effective than is 2,4-dichlorophenoxyacetic acid. The activity of these substances may be gathered from the fact that using a range of normal plant material the dibromo- and dichloro-phenoxy-propionic acids are from 20 to 100 times more effective than are the phenyl, indole and naphthalene compounds. The latter must therefore be used at a higher concentration.

We mentioned in our first lecture that nature probably uses a mixture of substances, or at least uses several materials in a regular sequence. In support of the idea we cited the work of THOMAS and DREW. We can now point out that we have ample evidence from the work of HITCHCOCK and ZIMMERMAN that growth promoting substances may produce synergistic effects upon each other. Briefly this means that one substance will induce a given effect at a much lower concentration if another substance is present at the same time. Mixtures of chlorophenoxy, indole and napthalene compounds exhibit synergistic effects in inducing root growth. Furthermore the ratio of the substances in the mixture is very important, but as yet no specific recommendations can be made, since these ratios must be worked out for each species under different conditions.

The size and appearance of roots induced by the use of alpha-naphthalene acetic acid differs from those induced by the indole compounds. The former induce roots that are relatively large and thick with a slight translucent pink tinge. The roots induced by the indole compounds are white, opaque, relatively long and stringy. These differences in " type " root have been well known to the practical gardener for generations. Some prefer one type and some another. Personally I do not know which is the best, but I do know that you can have which you please. Fruit growers and nurserymen will recognize that the rootstock M IX has short brittle roots, whereas M XII and M II have relatively long thin wiry roots. Previously this has been dismissed as " variety characteristics," but we are now recognizing that variety differences are due to the presence or absence of certain substances, called growth regulators.

We referred earlier to the fact that growth regulating substances have critical concentrations and that one substance may produce qualitatively different results if used at very different concentrations. In effect, therefore, one substance such as indole acetic acid may be both a root- and a shoot-forming substance, depending upon its concentration at the seat of the reaction. This is in fact the case, as has been shown recently. The first internode of a developing Sunflower seedling about an inch long was taken and cut into short pieces which were placed on sterile agar containing a substance to be tested. At very low concentrations (1 part in 1,000 million) indole acetic acid induced the formation of roots at the basal end of these extremely small pieces of stem, but at higher concentrations (1 part in 1 million) the same substance induced cell proliferation at the distal end but no roots. This is a new technique and its further application may yield much useful information. It also serves to illustrate the sensitive nature of certain biological methods, more sensitive in fact than many chemical methods, and to show that the concentration of growth substance at the seat of reaction is important. So far our techniques have been gross in the extreme, but refinement is to be expected with consequent increase in detailed information.

The importance of small amounts of substance can be further illustrated from the above work. In testing substances for their root-inducing properties only the upper half of the internode can be used, since the lower half generates roots of its own accord! Here is a point of the utmost importance. Whatever the substance responsible for the initiation of root initials, in untreated stems it is unevenly distributed over the first internode of the seedling, even at this very stage of its development. Such observations make one extremely careful in making generalizations. At any rate they show clearly that local concentrations or deficiencies of these substances do in fact occur. This provides us with a starting point for investigations into the causes of such things as the presence of "dormant" but well-developed buds in the axils of one year old shoots of Plums and Cherries, the formation of telescoped shoots (spurs) at definite positions in most Apple varieties and their almost complete absence in others ('Lord Hindlip'). But most of all it may help us to understand—and thereby overcome—the general failure of 'Cox's Orange Pippin' to set in years following even a moderate crop. It is well known that under some conditions and some methods of culture, notably these which keep the tree physiologically young, this difficulty is not insuperable. As fruit growers we have tended to think of our fruit trees "by the acre" or at least by single complete trees, assuming that a tree must function as a whole. Of course it functions as a whole, but only as regards a few of its major activities. In order to understand the functional activity of a perennial plant such as a fruit tree, it is necessary to realize that the metabolic activity of its several parts is determined by purely local conditions within the tree. Just how local these can be we have already indicated. Intelligent pruning practice is designed to break up these purely local conditions and create other conditions equally local in their effect. Unfortunately little intelligently designed pruning is as yet carried into effect, principally because nature is notoriously tolerant of man's abuses.

So far we have mentioned only the substances that encourage root-growth. It should be noted that some materials will discourage and may even prevent it. Thus adrenalin, which is a breakdown product of animal metabolism and may be extracted from urine, will inhibit root-growth at concentrations as low as 10 ppm. when added to a normal culture solution. The roots turn black, indicating that certain chromatogens have become oxidized. The material apparently acts towards these materials in the plant cell much in the same way as CO does towards hæmoglobin. It oxidizes more or less permanently a relatively unstable compound which was previously functioning as both an acceptor and donator of a particular molecule or part of a molecule. If adrenalin acts in this way then there must be other substances that will do likewise, but since only the " academician " is interested in inhibiting root-growth no intensive search has so far been made for root-growth inhibitors.

SWARBRICK has called attention to the fact that hormone-like substances may be produced in the above-ground parts of a grafted fruit tree and that they may be translocated to the root-stock which they affect causing it to be modified. Unfortunately this aspect of root-stock and scion relationship appears to have little commercial importance, and has therefore been neglected by most horticultural investigators. But since the problem is closely bound up with that of " incompatibility " it deserves much closer attention. One case only can be cited. In Citrus it has been shown by TOXEOPUS that the combination sweet Orange/sour Orange is incompatible, yet the reverse combination sour Orange/sweet Orange makes a good tree. Similarly the combination sweet Orange/Japanese Citron/sour Orange and sweet Orange/sour Orange/Japanese Citron are incompatible, yet the reverse combinations produce satisfactory trees. TOXEOPUS suggests that this is due to a toxic substance produced in the leaves of sweet Orange which is toxic to sour Orange. Up to the present no such substance has been isolated, but since there is an increasing number of such cases of reciprocal incompatibility it provides an interesting field of investigation.

Formative Effects

It was mentioned earlier that 2–4 D would initiate the development of seedless fruits when sprayed on to emasculated flowers at concentrations of 1–2 ppm. While not advising it as a commercial practice, the whole plant can be sprayed once at this low concentration without ill-effect. When sprayed over the entire plant at a concentration of 20 ppm. or more the same substance causes a disorganization of subsequent growth and development. Apart from severe epinasty there is no effect upon those parts of the plant already formed, but the disorganizing effect is confined to those parts which develop subsequent to spraying. At high concentration, 1,000 ppm. (*i.e.* 1 lb. in 100 gallons of water) the effect may be disastrous.

The present section deals with the use of 2–4 D and other growth regulating substances at concentrations in excess of those required to produce fruit set and prevent preharvest fruit drop, but at concentrations below those necessary to induce death by complete disorganization.

Tomato plants that have been sprayed with 2–4 D at 10–50 ppm. show the following symptoms. The growing points become thin and spindly, the internodes are unduly long and the leaves are severely "Frenched" or "Shoe stringed." The fruits which develop from flowers produced in this abnormal region tend to be elongated and "beaked." Many of them "set in the bud," that is the fruit begins to swell and develop before the flower has fallen, so that it bursts through the floral parts and these may be carried away and remain as dried remnants on the rapidly expanding seedless fruit. Complete details and photographs of this were given by SWARBRICK in a recent publication.

Similar effects produced by relatively high concentrations of certain substances have also been noted by others, particularly HITCHCOCK and ZIMMERMAN. These symptoms are in many ways similar to those of certain virus diseases. In any case the Tomato plants treated with 2–4 D look like "wild," "unimproved" or "degenerate" stock. The importance of these chemically induced symptoms cannot be overemphasized and are stressed by HITCHCOCK and ZIMMERMAN as follows:

"Under the influence of hormone like chemicals the pattern texture and venation of the leaves grown were noticeably modified. The change in the position of the veins and the clearing of the veins induced by substituted phenoxy and xylenoxy acids made the leaves resemble those of virus diseased plants. The effects are systemic rather than local. Since the causal agent of virus diseases has recently been considered as a chemical compound, it seems pertinent to point out these similarities. One difference is that virus diseases can be transmitted by grafting or inoculation, whereas the chemically induced effects cannot."

The observations of HITCHCOCK and ZIMMERMAN on the chemical aspects of these substances is of interest in this connection. They state that "increasing the length of the side chain in the halogen phenoxy compounds not only increases the root inducing activity but causes complete inactivation of the modification responses." These observations have been confirmed by ROBERTS and STUCKMEYER.

The modification of organs by means of growth regulating substances raises a number of important issues and deserves more thorough investigation. ZIMMERMAN and HITCHCOCK have shown that 2,3,5-tri-iodo-benzoic acid is a "flower forming substance" so far as Tomatoes are concerned. Plants subjected to small amounts of this substance volatilized into the air develop flowers from the axils of leaves, *i.e.* in the places normally occupied by side shoots.

The terminal growing point is also converted into a flower truss. Although it is not usable at present, probably because we do not have sufficient information as to how it works, it is undoubtedly a "flower forming substance" as envisaged by the early plant physiologists.

Weed Control

Weed control is one of the major expense items in economic crop production. Previous to 1940, either mechanical or hand weeding was the only method of dealing with this problem in the majority of crops. In a few crops such as Onions and cereals the principle of "selective" weeding by the use of chemicals with a differential effect upon the plant population was already firmly established prior to 1940. The chemicals used were sulphuric acid, copper sulphate, etc. The method did not develop owing to the few crops upon which it could be used and the corrosive nature of the most effective materials. But the principle of differential killing was firmly established as a commercial possibility. With the rapidly increasing number of synthetic growth regulating substances available in the immediate pre-war period the way was open for a rapid expansion of this method. A recent publication claims that growth regulating substances were first used as selective weed killers by I.C.I. workers at Jealots Hill in 1940, but that official secrecy regulations did not allow the publication of the results until recently. It is unfortunate that war should accelerate such developments, yet at the same time cloud them in secrecy for so long.

It is interesting to notice that only two materials have proved usable as differential weed killers on a commercial scale, that they were developed more or less simultaneously, one in England and one in U.S.A., and that they are closely related chemical substances. The material developed by I.C.I. workers in England is 2-methyl-4-chlorophenoxyacetic acid ("Methoxone"), whereas the material developed for the same purpose in U.S.A. is 2,4-dichlorophenoxyacetic acid (2–4 D). The literature of these substances, particularly 2–4 D, now runs into hundreds of separate publications, so that it is almost impossible to keep up to date. No attempt will be made to give practical recommendations for the use of these substances since this would more than use up all my time. Nor do I propose to discuss the relative merits of 2–4 D and Methoxone, interesting and informative though it is, particularly from the theoretical standpoint. That they are both accepted and widely used in practice is an indication that their differences in this respect are not important.

It is now known that these substances produce their effect through their action on very young cells. Much of their selective action therefore depends upon

(*a*) Correct timing of the application in relation to the stage of development of the crop plant and weeds to be destroyed;
(*b*) The rate and/or concentration at which it is applied; and
(*c*) The anatomy of the plants to be treated.

The relative importance of these several considerations varies according to circumstances. These considerations, of course, hold for all chemicals used as selective weed killers, but particularly for those that are used at a very low concentration and which produce their effect by disorganizing normal growth. The importance of correct timing of application has been recently emphasized by SLADE, who points out that Linseed can be successfully weeded only after it is three inches high. Previously it is as sensitive as the weeds. It may be further emphasized by reference to the control of Golden Rod. These plants are quite resistant to 2–4 D during most of the summer, but become extremely sensitive at the time they are producing their underground rhizomes. Presumably the 2–4 D enters the plant and finds its way to these actively growing regions which become disorganized. It was thought at one time that 2–4 D could not be used effectively against woody plants, but more detailed study has shown that woody plants are resistant because they have a small amount ot young cells in relation to old ones. More effective timing enables 2–4 D to be used against a wide range of woody plants. Notable success has been obtained against the Cherokee Rose, which was overrunning thousands of acres of ranch land in Texas. The relative resistance of monocotyledons—Grasses, Sugar Cane, etc.—to 2–4 D is due largely to the fact that the growing regions of these plants are very deeply seated and are protected by leaf bases. The development of satisfactory methods of selective weed control is not just a simple process of trying out a range of concentrations of various substances. Detailed knowledge of plant anatomy, physiology, and chemistry must be pressed into service.

AUDUS and QUASTEL have recently pointed out that Courmarin—a commoh plant metabolite—may be used as a selective phytocidal agent. This development is based upon the fact that the unsaturated lactone grouping is a frequent feature of naturally occurring substances that have inhibiting effects upon all cell growth. They cite previous workers for the fact that Courmarin, parascorbic acid, and β angelica lactone will all suppress the germination of seeds at concentrations as low as 100 ppm. AUDUS and QUASTEL conclude from their work that Courmarin exerts a double rôle, namely, it inhibits germination and subsequent root-growth. Its action in suppressing root-growth is broadly similar to that of 2–4 D, and its "formative effects" apparently identical to these of 2–4 D. In its inhibitive effects upon germination, Courmarin is much more active on certain species than is 2–4 D, which does not suppress germination at less than 10 ppm. The two substances also differ in that their differential effects do not run parallel.

Perhaps the most important contribution of this excellent piece of work is their observation—to be reported more fully at a later date—that the effects of 2-4 D and Courmarin are reversible. They say " The facts indicate that these substances must effect their inhibitions by forming loose combinations or easily dissociated compounds with enzymes or metabolites in the plant cell."

The work is also of interest in that it focuses attention on certain naturally occurring substances which can be isolated from plant tissue and which are equally as potent in their effect as are the synthetic substances such as 2-4 D and Methoxone.

A refinement in the selective action of 2-4 D has been obtained by using its methyl, ethyl and amyl esters. These are dissolved in a suitable petroleum oil base and applied either as aerosols or as emulsions. It is claimed by some that the petroleum oil acts as a synergist, but whether this is so or not, it is proved beyond doubt that in most cases a better differential effect can be obtained by this method with the use of less active substance. Concentrated emulsions or straight oils containing 2-4 D or other toxicant are now being applied to large areas of wheat and rice by means of aeroplane. Weed control in the vast prairie areas of North America, Argentina and Australia is now a practical proposition thanks to a combination of the aeroplane and the oil soluble esters of highly effective selective herbicides such as 2-4 D and methoxone.

It must be emphasized that Beetroots and Mangolds are particularly sensitive to 2-4 D and Methoxone. So far as I know the limits of tolerance for these plants has not been worked out, but it must be extremely low, since they are known to have been adversely affected by dusts which were being applied over half a mile away. Any physiologist who can find the reason for this extreme sensitivity will make a real contribution to our knowledge of how these substances work, since it is safe to assume that in Beetroot and Mangold there is something that is easily " blocked " by 2-4 D and Methoxone.

A completely different aspect of the selective control of weeds by chemicals is the use of petroleum oils. This development is only just getting under way, but promising results have been obtained. In U.S.A. Carrots, Cranberries and Linseed are weeded by spraying with narrow boiling fractions of certain selected oils and the consumption for this purpose is estimated at well over two million gallons a year. As in the case of 2-4 D, the concentration and dosage rate must be worked out for each crop and for each local climatic region.

Other uses of these substances in weed control could be discussed at length. 2-4 D is now being used to control Alligator Weed which was threatening to choke the waterways of the lower Mississippi valley. It is being used on a large scale to prevent pollen development of Ragwort in areas where this plant causes much hay fever and thousands of gallons are used to control weeds on roadways and railway cuttings. Golf courses are taking up its use with enthusiasm and machines dispersing 2-4 D over the fairways of U.S. golf courses are now almost as common as mowing machines.

Other Practical Applications

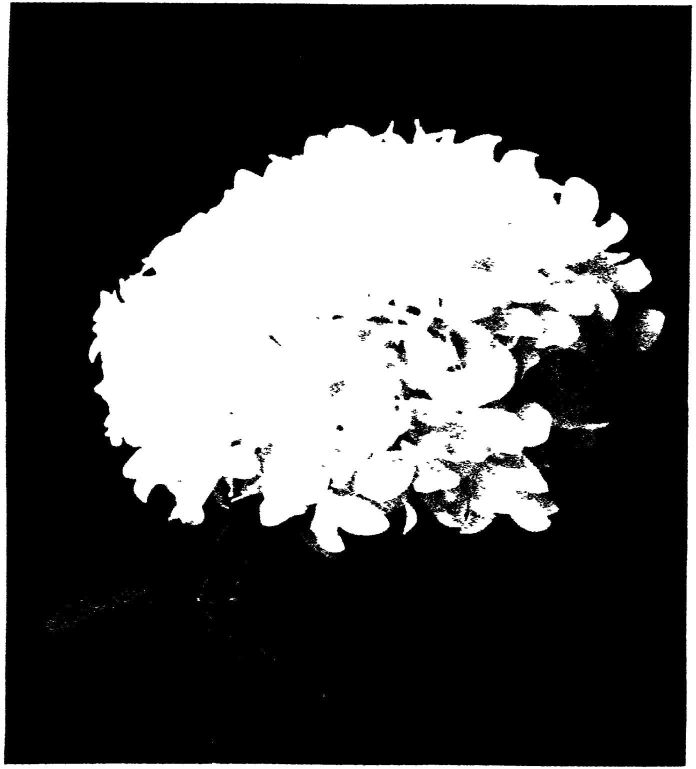
(a) *Inhibition of sprouting*

It has been found that the sprouting of Potatoes and other root vegetables can be inhibited by the use of chemicals. Alpha-naphthalene-acetic acid and its various compounds have been found most effective. Since this discovery was made it has been developed and used on a large scale both in U.S.A. and Holland, but has not been adopted in England. Its rapid adoption in U.S.A. probably depends upon the fact that large quantities of potatoes are required for the quick freeze chipped potato industry. These potatoes must be stored at relatively high temperatures in order to prevent the accumulation of reducing sugars which is detrimental to good quality fried Potatoes. Under these high temperature storage conditions wastage from sprouting was considerable. Large quantities of Potatoes are now stored in specially constructed store houses at relatively high temperatures and sprouting is completely inhibited over a storage life of 6–7 months.

Although the acid will inhibit sprouting if it is brought into contact with the buds, this is difficult to achieve in practice. A volatile ester is therefore employed. This may be the methyl, ethyl, or amyl ester depending upon availability and cost. It is either dissolved in a solvent and sprayed into the Potatoes as an " aerosol " or is used to impregnate paper shavings which are packed with the Potatoes at the time of storage. During the war the Germans developed the use of alpha-naphthyl-dimethyl-ether for inhibiting the sprouting of Potatoes. This is used as a 3 per cent. powder on talc or diatomaceous earth and applied at the rate of 200 grams of powder to every 50 kilos of Potatoes.

The big problem to be tackled in this connection, however, is the delaying of bud development in regions subject to late spring frosts. Certain varieties, ' Medaille d'or ' and ' Crawley Beauty ' for example, have this character built into their chromosome structure, but arguing from a general standpoint this delaying of bud break must be due to the presence of a particular substance. What is it ? So far as the writer is aware, this very important practical problem has not been the subject of sustained work. HITCHCOCK and ZIMMERMAN have been granted U.S.A. patent 2341867 for the use of alpha-naphthalene acetic acid to delay bud development when used as a dust, aqueous solution or in an oily carrier at from 25 to 100 ppm. They claim that the treatment is effective if applied one to three weeks before blossoming. Preliminary work by the author not previously published showed that the results of such a treatment are unpredictable. Sometimes bud break is delayed, sometimes it is not. On some occasions treated terminal buds remained dormant over the whole of the succeeding growing season, and on others they made a small amount of growth, then ceased so that " spur-like " growths were produced. The work of MITCHELL and CULLINAN suggests that vegetative buds are more sensitive to the effect of naphthalene acetic acid than are the flower buds. Obviously alpha-naphthalene acetic acid is physiologically active in respect to bud growth, but as yet we do not have sufficient knowledge to be able to use it in practice, at least so far as outdoor trees in England are concerned.

The reverse side of the picture is the enforced or artificial bud dormancy created by growing deciduous trees such as Apples and Pears in warm countries with prolonged periods of equal day and night. Under these conditions flower and vegetative buds may fail to break in spring or do so over a protracted period. This is disastrous from



Photos, Malby.

FIG. 131—*Viburnum macrocephalum* var. *grandiflorum*
(See p. 362)

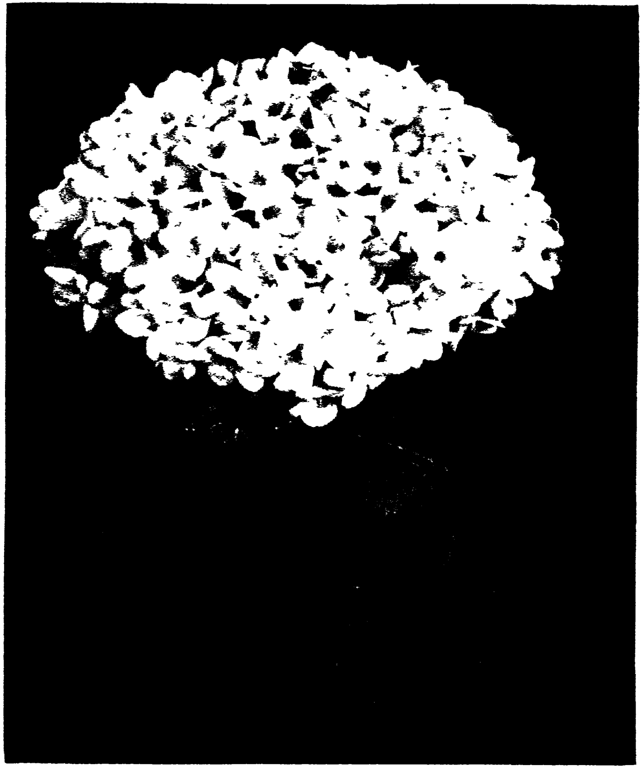


FIG. 132—*Viburnum Carlcephalum*
(See p. 362)

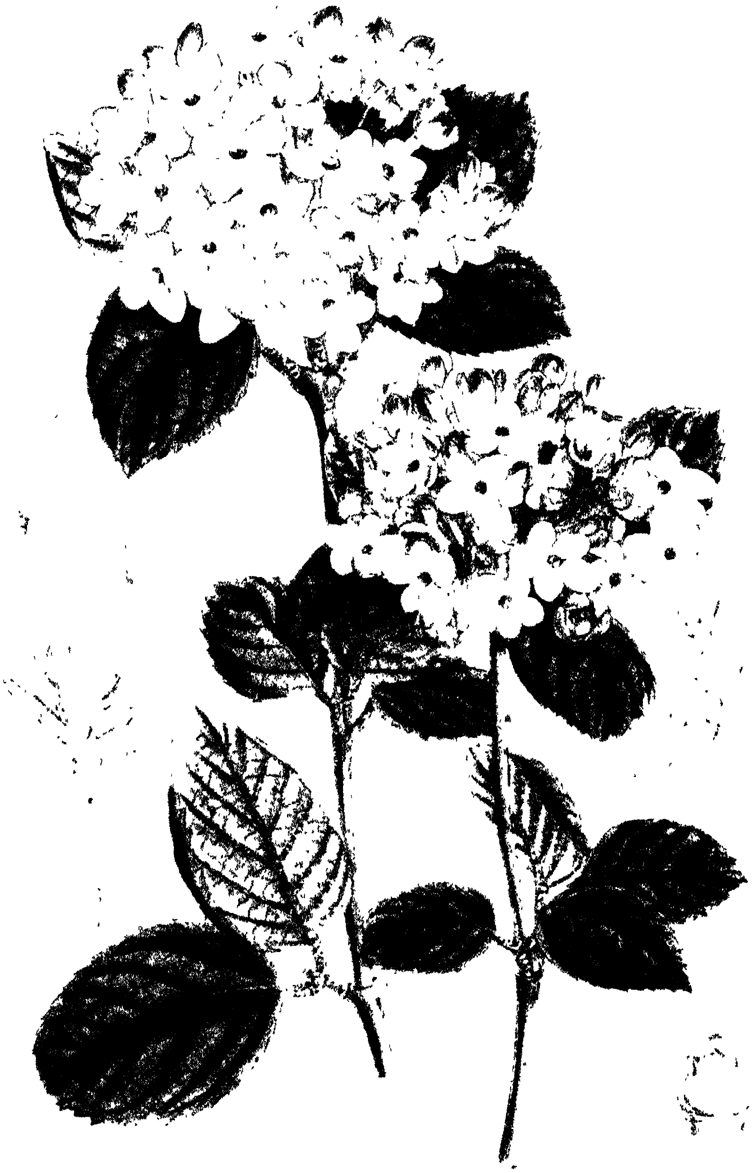


FIG. 133 *Viburnum Carlesii*
[Plate taken from the Botanical Magazine, Tab 8114] (See p. 361)

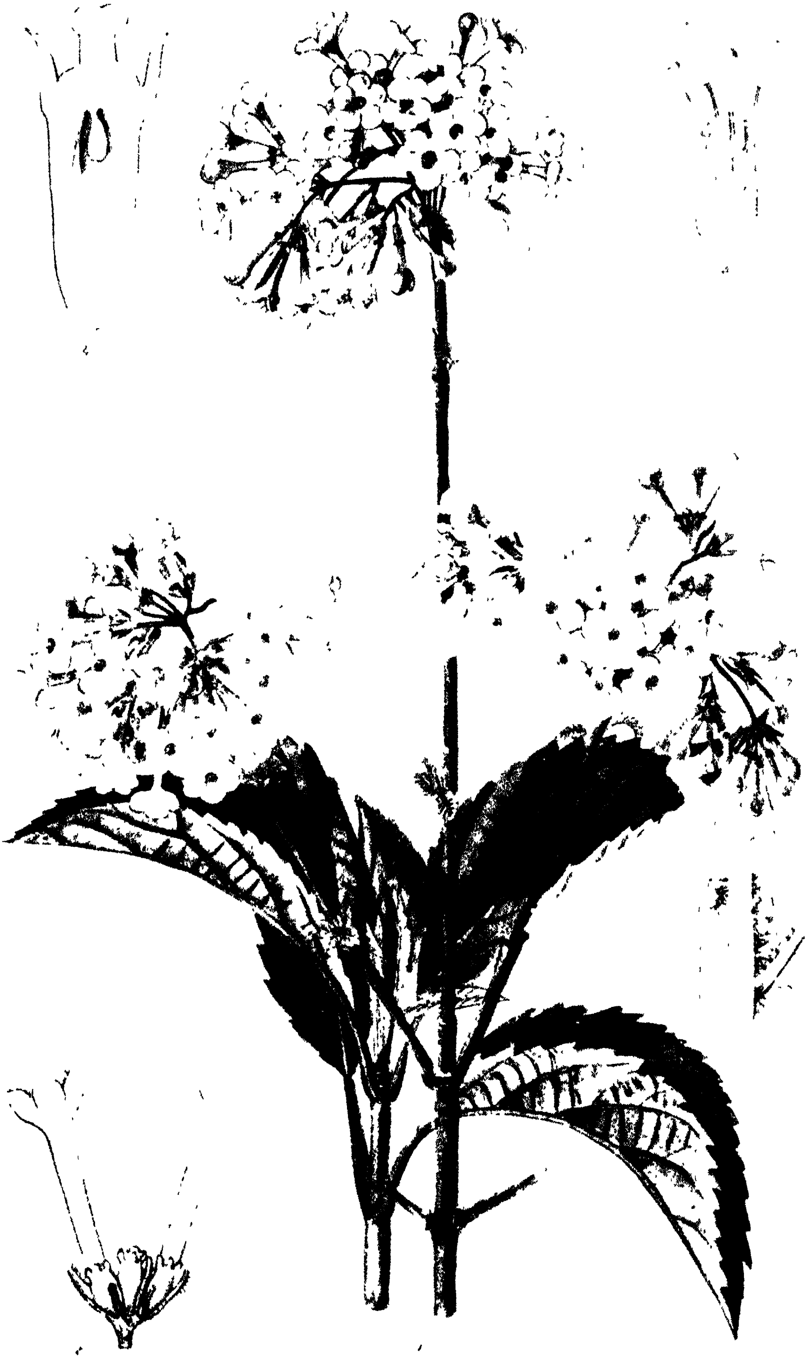


FIG. 134—*Viburnum fragrans*

[Plate taken from the Botanical Magazine, Tab. 8887] (See p. 360)

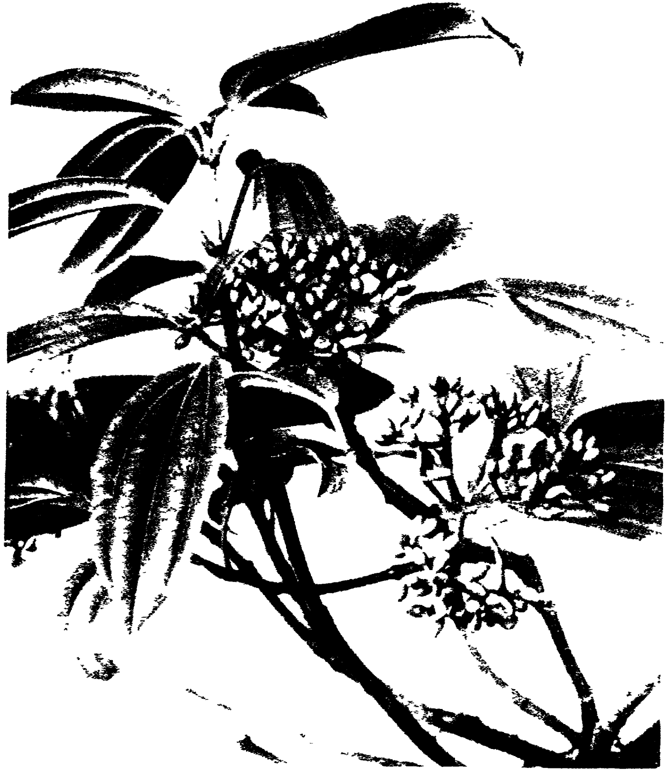


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FIG 135—*Viburnum Davidii* (See p 363)

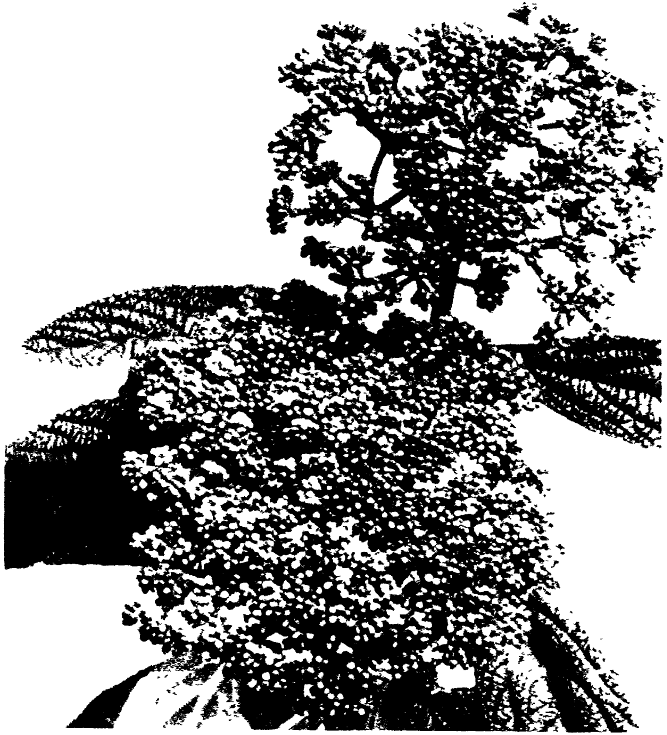


FIG. 136—*Viburnum rhytidophyllum roseum* (See p 363)

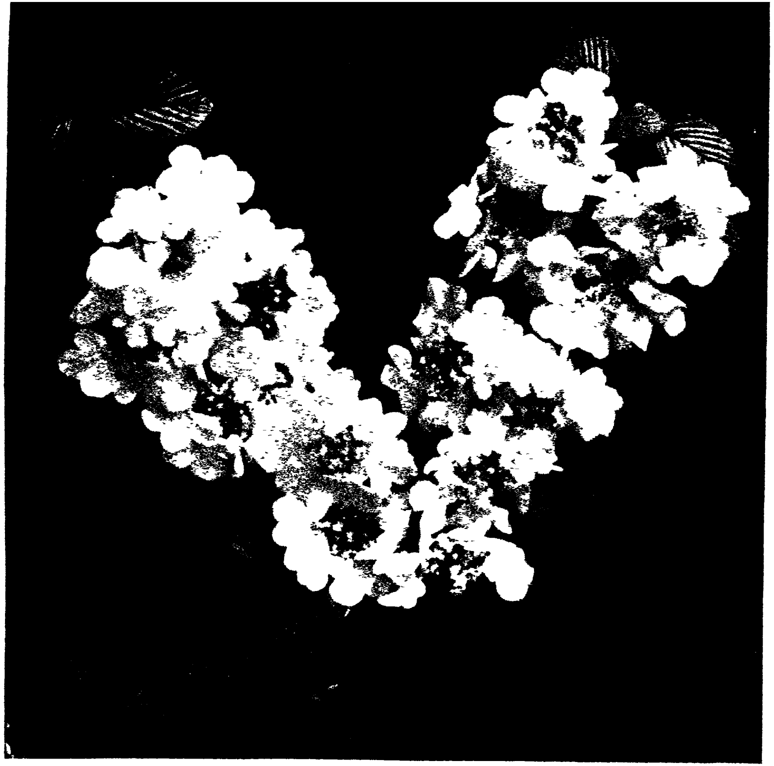


FIG. 137—*Viburnum tomentosum* 'Rowallane' variety (See p. 363)

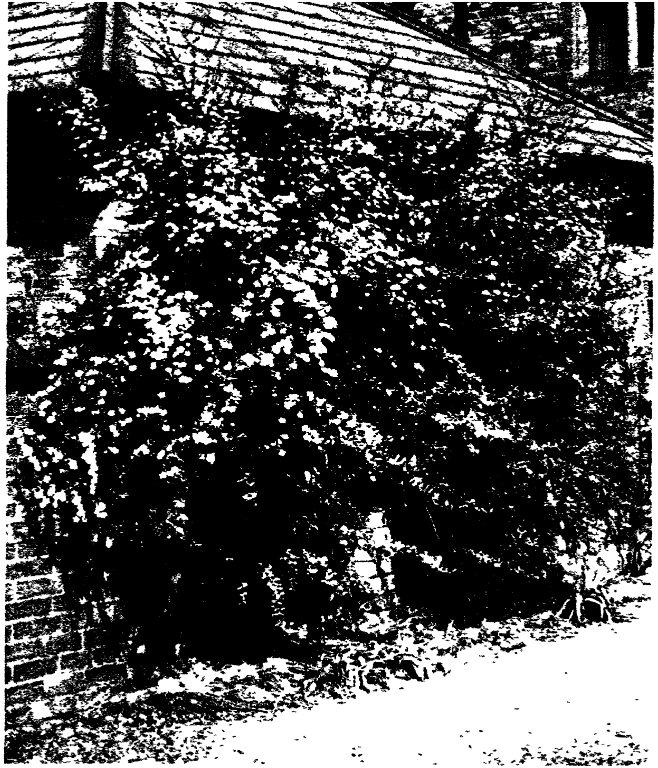
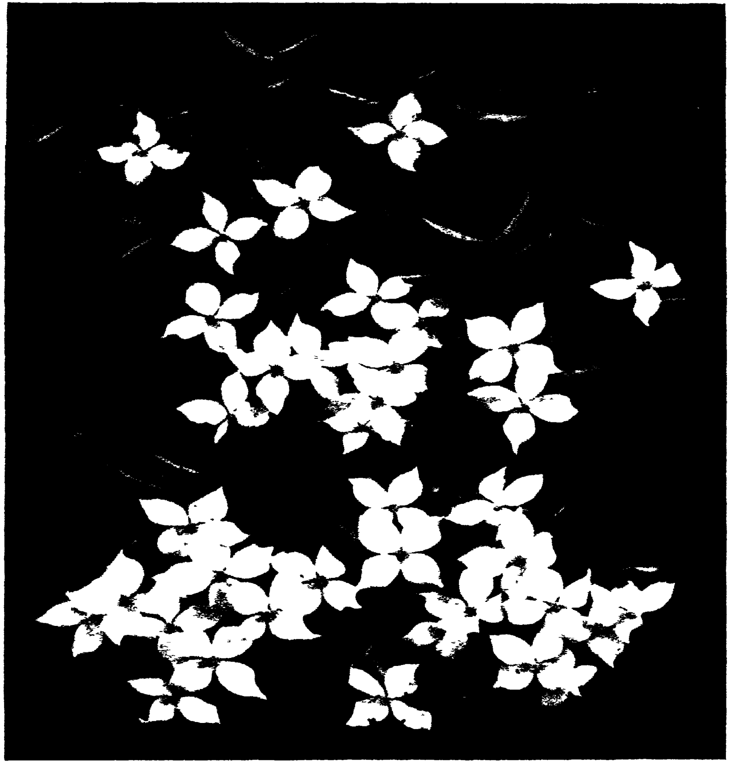


FIG. 138—*Rosa Ecae* (See p. 371)



Photos, Mally,

FIG. 139—*Cornus Kousa* (See p. 371)

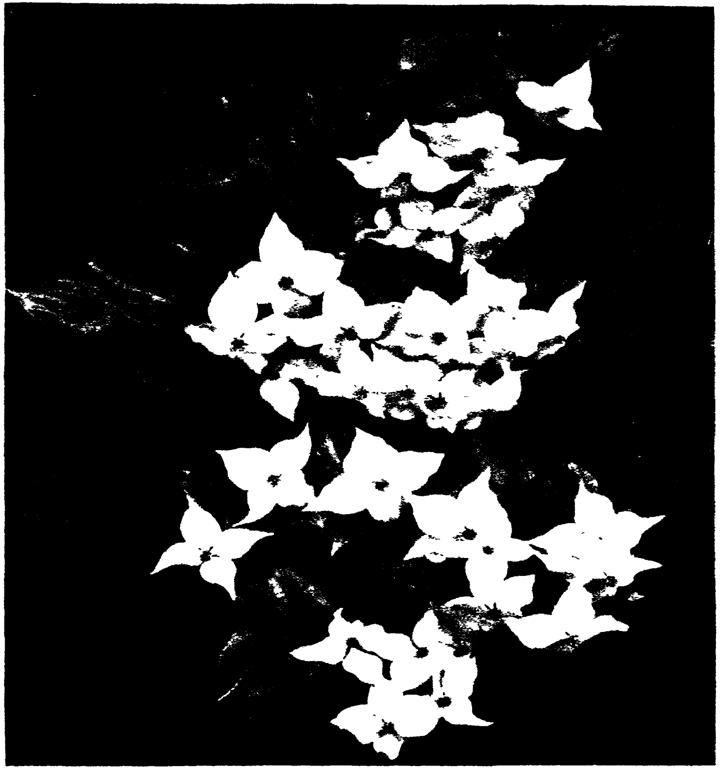
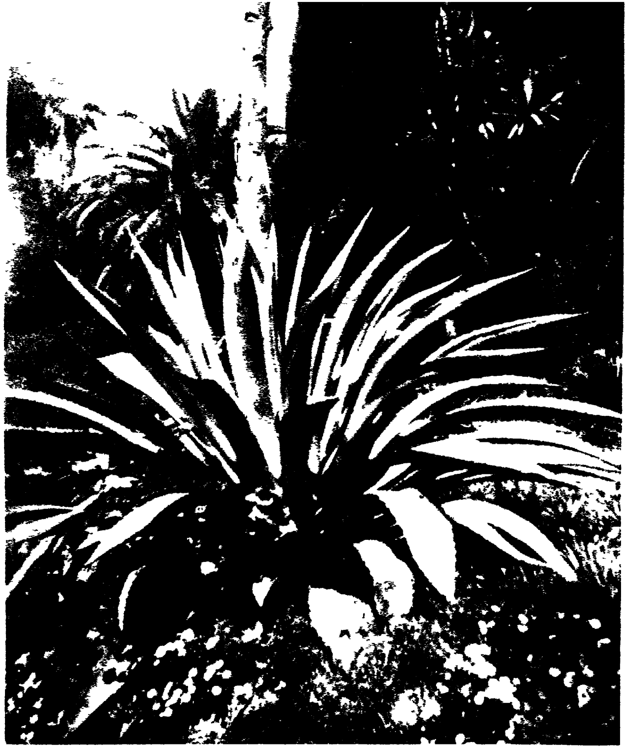
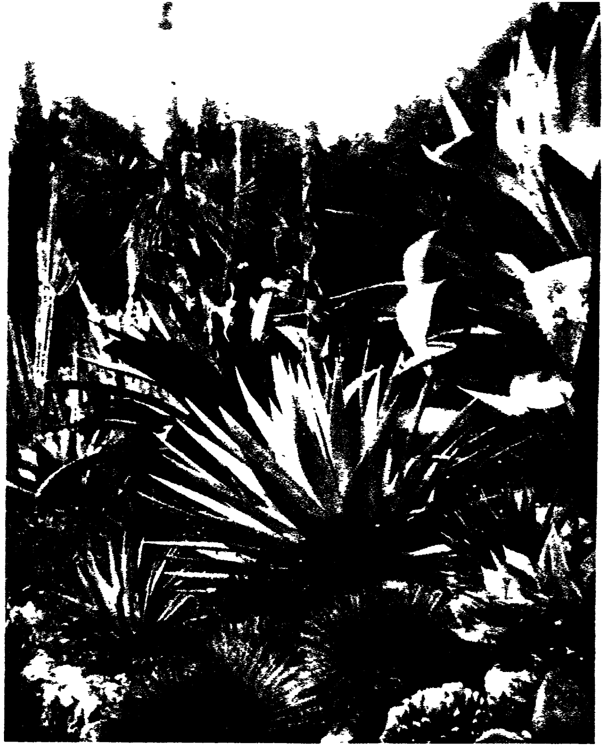


FIG. 140—*Cornus Kousa* var. *chinensis* (See p. 371)





Photos, Dorothy Hanbury

AGAVES AT LA MORTOLA (See p 372)

FIG 141—*Agave* 'Mortola Garden Hybrid'

FIG. 142—*Agave applanata* flowering for the first time, behind *A. Franzosini* (flowering) and *A. ferox*

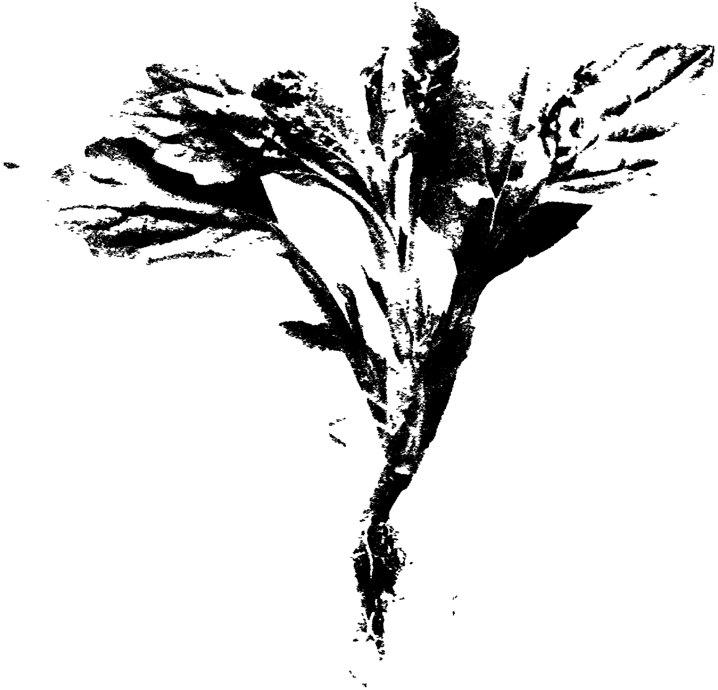


Photo B. Buck

FIG. 143.—Aster attacked by Plum aphis. (See p. 320.)

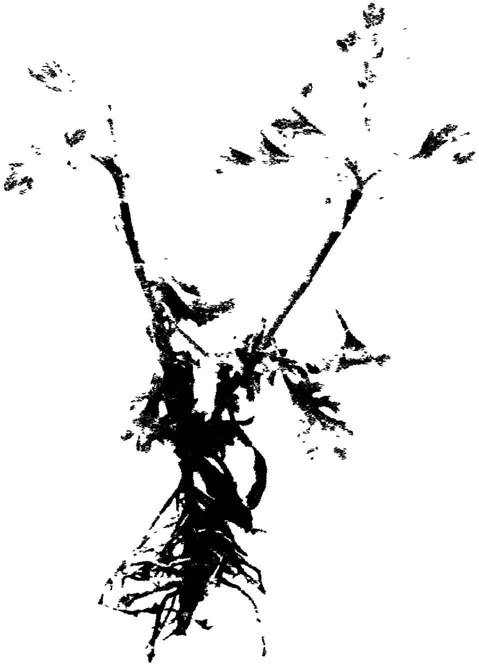


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FIG. 144.—*Chrysanthemum rubellum* attacked by Leaf Eelworm, *Aphelenchoides ritzema-bosi*. (See p. 364)

the fruit growers' standpoint and considerable effort has been made to overcome this trouble in particular in Palestine and South Africa. It has been shown recently that certain dinitro-cresol compounds— known to stimulate respiration— can be used to overcome this trouble. The significance of this discovery lies in the fact that the substances known to be effective are those that stimulate respiration. Dormancy of course is associated with a slowing down of respiration, which leads us to the only suggestion that time permits, although the matter deserves much more prolonged discussion. Animal physiologists when they wish to rest up a person or a particular organ employ respiration inhibitors of which they have quite a number. One of these, iodo-acetate, inhibits respiration by forming a loose chemical combination with the enzymes involved in oxidation-reduction processes. We have already seen that adrenalin may inhibit root-growth by a similar kind of action.

The indications are quite clear and definite. The problem of delaying or hastening bud development in perennial plants should yield to a systematic and planned attack. Since it involves one of the most fundamental and deeply rooted cycles of activity which has been built into our perennial plants over millions of years, results cannot be expected from occasional or *ad hoc* work. Obviously alpha-naphthalene acetic acid, and presumably other substances as well will inhibit bud growth, or keep buds in a dormant condition if applied at the right concentration at the right time. While it is not impossible that these two conditions will be discovered by our present methods it is more likely that the problem will yield to a planned physiological attack such as that now in progress at the Boyce Thompson Institute.

Hastening and Delaying Fruit Ripening

Every commercial fruit grower recognizes the financial advantages of early fruit ripening. Little attention has as yet been paid to the possible use of growth regulating substances as accelerators of the ripening process. Vernalization has shown that the period between germination and maturation may be shortened in cereal crops, so that there is every reason to expect that the period between flowering and harvest can be shortened in most of our fruit crops. This, of course, is not always either necessary or desirable, but it would have considerable advantages in the case of Grapes particularly. In the same way delaying ripening could have many advantages.

Recent reports indicate that German workers claim " novel properties " for 1-thiocyano-2,4-dinitro-benzene which was originally developed as a fungicide. It was found that when this substance was mixed with copper oxychloride in order to improve its fungicidal action, the mixture accelerated fruit ripening in Grapes and Tomatoes. It is also claimed that the mixture accelerates ripening of the wood, thereby increasing its resistance to frost. Such claims, if substantiated, are of more than usual importance and interest. Incidentally from purely theoretical considerations the combination of copper oxychloride with thiocyano-dinitro-benzene should be a powerful respiratory stimulant.

No claim has so far been made for specific substances that will delay fruit ripening. It is well known of course that ethylene is used on a commercial scale to hasten the ripening of bananas and pears which have been picked green and immature in order to ship them over long distances. In commercial apple stores it is essential that only one variety should occupy one storage room, since the small amount of gaseous products liberated by one variety may shorten by several weeks the storage life of another. Not everyone is aware that in California the Lemon crop is picked while the fruits are still very immature and that they are then stored in boxes in large specially constructed storage cellars, where they are either "sweated" or treated with ethylene in order to bring them up to marketing condition. In this way the Lemon crop is marketed over a very long period, although the picking season may not extend beyond a few weeks twice a year. The point is that ripening is delayed or controlled by physical means and then chemical means are used to bring them up quickly to saleable condition. Oranges are not treated in the same way but Citrus growers are fully alive to the possibilities of using growth regulating substances to slow down respiration. They already adopt most elaborate procedures to slow down loss of water by transpiration and it would not be difficult to incorporate another treatment. At present the fruit is washed, then treated with a surface sterilizing agent to destroy any fungi or spores, then dried and then rewaxed and polished. Growers who take such trouble with fruit are not going to neglect any advantage that may be gained from adding a further material that will reduce respiration in addition to transpiration.

It is not improbable therefore that in the near future a means will be found of using chemicals to prolong the storage life of fruits and vegetables, thereby reducing the capital expenditure required to erect cold stores and gas stores and thereby adding to the variety and quantity of produce that will be available to those who live in places where such produce cannot be grown.

It is evident that no attempt has been made in these lectures to provide the practical gardener with a guide book to the use of plant-growth regulating substances. That is best done elsewhere, and in any case it would not have fulfilled the wishes of Dr. Henry Masters whose memory we honour. Neither do these lectures claim to be a complete review of present knowledge. Far from it. They present a purely personal selection of the material which the author thought would be of interest to you. Before long this subject must be split up into sections, so that at some future date you will have the pleasure of hearing Masters Memorial Lectures dealing with one particular aspect of plant-growth regulating substances. Then and only then will the subject receive the attention it deserves.

May I in conclusion plead for caution and discretion? It is so easy to ascribe all and every phenomena of nature as an effect of growth regulating substances or hormones. But there still remains the known effects of manures, nutrients and mineral nutrition upon plant-growth. Where observed phenomena can be otherwise explained, then let us use these explanations until they are no longer adequate to encompass all the known facts.

Twenty years ago vitamins and hormones were shrouded in mystery and plant-growth regulating substances had been postulated but not isolated. Now they are the subject of popular science and are articles of every-day commerce. In fact, the march of events is so rapid that all I have said to-day will be ancient history ten years from now, for by that time completely new materials and new concepts of their use and application will be engaging our attention.

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THE GENUS VIBURNUM

By A. Burkwood

THE Viburnums, originating as they do in so many parts of the world, are of unusual geographical interest, different species having been found in Japan, China, North America and Europe.

Few shrubs vary so much in characteristics, habits, and individual qualities as the genus Viburnum, some forming quite small, rounded bushes, others attaining the dimensions of bushy trees.

Amongst this very large family, which includes species both evergreen and deciduous, we find plants ideally suited to conditions favourable to almost any garden whether large or small irrespective of the nature of the soil, even chalky conditions being no detriment to their successful cultivation. Again we find varieties which are specially grown for the delicious scent of their flowers, others for the charm of their autumn coloured foliage and berries. Most Viburnums may readily be increased from cuttings, layers or seed.

For the purpose of this article I intend to generalize, avoiding technical and botanical descriptions as far as possible and thereby endeavour to record simple observations which may help to clarify the genus for the benefit of the uninitiated. I propose therefore to select varieties suitable for ordinary garden cultivation and to give descriptions of their individual merits and periods of flowering.

Viburnum Tinus (Laurustinus)

Coming from the Mediterranean regions this evergreen, now generally common to European Gardens, is invaluable, it quickly forms a dense rounded bush 6 to 8 feet high and as much in diameter, with masses of branches and twigs from the ground level which remain clothed with deep green leaves usually 2 inches long, 1 inch wide. The season of flowering during the winter months from November to April, with terminal flat clusters of rosy flowers ageing to white, generally 3 to 4 inches across, helps to make this shrub indispensable to any garden.

As a screening bush or used for protective purposes for other choice, though tender, garden subjects it is admirable. Whilst it may safely be planted in sunny or shady positions it must be regarded as doing best in soil of a porous or sandy nature.

There are many forms in cultivation (some very good indeed) but generally the ordinary type should suffice for most gardens.

Viburnum fragrans, China

A fine shrub of loose habit renowned for the scent of its flowers, will attain a height of 6 to 8 feet in a congenial situation; the small panicles of flesh-pink tubular flowers appear from August to February.

Unfortunately it is quite evident that many bad forms of this variety are in commerce, some of which are practically worthless for they seldom blossom freely. For the best results it should be planted in semi-woodland or partial shade. (Fig. 134.)

Viburnum Carlesii

Probably the best known and most popular of the genus by virtue of its delicious scent. A native of Corea it was introduced to Europe from Japan in 1902 by Kew Gardens, a deciduous shrub often attaining a height of 6 to 7 feet and equal in breadth, many specimens of these dimensions may be seen where least expected in Sussex gardens.

The terminal rounded clusters often 3 inches across produced during April, consists of tubular fertile flowers, pink in the bud stage but opening to pure white, usually five petalled, the corolla being ½ inch wide supported by slender tubes. (Fig. 133.)

For commercial reasons practically all plants which are obtainable from nurserymen are grafted or budded on the common Lantana, therefore it is advisable to destroy ruthlessly any shoots from the base or below where it has been worked, otherwise they will quickly dominate the shrub itself and finally destroy it. A warm or sheltered position should be chosen for planting this choice subject which resents being moved.

Viburnum bitchiuense, Japan

An upright loose growing deciduous shrub with slender branches attaining 6 to 8 feet high, best planted in semi-woodland, the flower trusses closely resemble the variety Carlesii except that the formation of the truss is much looser in appearance and more pink in the bud stage, whilst the individual tubular flowers are longer and appear during May, sometimes again in August.

Viburnum Burkwoodii, Garden Origin

A semi-evergreen, quick growing shrub which will attain a height of 6 to 8 feet and fairly bushy with shining deep green leaves generally 2½ inches long and 1½ inches wide.

The bulk of its flower trusses are fully open in the middle of April, pink in the bud stage, similar to Carlesii, but opening to pure white, being sweetly scented. Often complete trusses of flowers appear during the autumn and winter months. Trained as a wall plant it is admirable for a north wall.

This hybrid between the favourite Carlesii and the evergreen variety *utile* received an Award of Merit in 1929.

Viburnum, ' Park Farm Hybrid '

A similar plant raised from the same parents with the exception that the flower trusses are larger, and the plants attain breadth instead of height ; I have seen plants 7 feet in width yet only 4 feet high.

Viburnum Carlcephalum, Garden Origin

A recently introduced hybrid between *V. Carlesii* and the Chinese (wild form) of *V. macrocephalum* the foliage being similar but much larger.

The cymes are usually 4 to 5 inches across, flat to globose in character and highly scented. It is a very hardy compact, vigorous growing, deciduous shrub and within a reasonable time should reach the dimensions of 8 feet high, 5 to 6 feet in diameter. (Fig. 132.)

Like most of the others of this very large family it quickly responds to heavy mulchings of cow manure.

Viburnum macrocephalum (wild form from China)

Although this variety is rarely seen in gardens in this country, it is a most desirable and interesting shrub well worthy of cultivation and reproduces itself true from seed.

The large, flat, terminal cymes often 4 to 6 inches across are produced during the month of May, each truss or cyme being surrounded by a single row of large creamy white, sterile flowers about 1 inch across, whilst the centre flowers of the cymes are fertile and sweetly scented. (Fig. 131.)

Undoubtedly this is a much hardier shrub than the variety *V. macrocephalum grandiflora* usually seen in gardens growing on walls which bears large globose heads of purely sterile flowers.

Viburnum Opulus

Often seen growing in our woods and hedgerows this is well worthy of cultivation, it quickly forms a large bush or tree with leaves slightly resembling the Maple. Commencing to flower in early June the cymes 3 inches across are filled by a single row of sterile white flowers, the centre of the cyme being composed of much smaller flowers which are fertile but without scent.

It never fails to produce in abundance its large clusters of bright red berries during August and September, whilst the leaves, before dropping, often assume most brilliant autumn tints.

Viburnum Opulus fructo-lutea

Similar in habit and character but with yellow berries.

Viburnum Opulus sterile (Guelder Rose)

This well known variety with globose trusses of white sterile flowers, generally known as the snowball tree, is most easy to grow and seems to thrive in any position or conditions. Often seen in suburban gardens as a tall neglected shrub or shapely bush.

Viburnum tomentosum plicatum (The Japanese Snowball)

This is a very charming shrub, up to 5 to 6 feet high of spreading habit, the stiff horizontal branches are mostly covered during the later part of May with globose trusses of flowers, first cream changing to snow white.

I have vivid recollections of seeing a bed of 50 plants which were planted 30 years ago and I understand have never failed to produce a magnificent show every May since planted.

Viburnum tomentosum plicatum grandiflorum

This variety whilst similar in habit of flowers forms a rounded bush, a much slower grower. The leaves are almost round yet they begin to assume brilliant autumn colouring often during the summer long before the leaves begin to fall.

Viburnum tomentosum, native of Japan

A quick growing shrub 6 to 8 feet high, the branches of which carry flat umbels of flowers in early June, emanating from the leaf axils the umbels are 2 to 3 inches across and pure white, the marginal flowers being 1 inch across and sterile, centre flowers fertile. (Fig. 137.)

A most useful shrub for autumn colouring or grown as a specimen in the shrubbery.

Viburnum Davidii, native of Western China

This dwarf evergreen variety is most suitable for planting in the front of the shrubbery or on the rockery, usually growing to about 1½ to 2 feet high. (Fig. 135.)

Introduced by the late E. H. WILSON in 1904, it has proved quite hardy in British gardens, the leaves, dark green, are thick or leathery in texture and prominently veined, the flat flower trusses are produced in May; individually the flowers are very small and dirty white in colour. There are two forms of this variety, male and female; the variety known as *foemina* being much the better of the two, this form bears large clusters of small berries, a beautiful rich blue in colour.

Viburnum Henryi

This very fine shrub was introduced from China in 1900. This makes an erect loose growing shrub 5 to 6 feet high, evergreen in character with thick narrow leaves 4 to 6 inches in length, the surface being shining deep green, the undersides of which are much paler. The stiff pyramidal panicles of flowers are later followed by masses of bright red berries during the autumn in striking contrast to the foliage.

Viburnum rhytidophyllum, Central and Western China

Introduced in 1900 by the firm of Messrs. JAMES VEITCH AND SONS it has proved itself to be a fine acquisition and most suitable for planting at the back of large borders or shrubberies. Being quite hardy it will attain a height of approximately 8 to 10 feet and 5 to 6 feet in diameter.

The dark green, deeply wrinkled shining leaves are usually 7 inches long and 2½ inches wide, the terminal flower buds appear during the autumn and remain undamaged throughout the most severe winters, developing into larger trusses of dull white flowers during the following May and June. These trusses are often 4 to 8 inches across usually followed later with large clusters of red berries of medium size turning to black. (Fig. 136.)

Viburnum Lantana, the Wayfaring tree

A native of Europe often found growing wild in the South of England, particularly in chalky districts. Although hardly worth consideration as a garden subject, in its wild and more natural surroundings it is a great asset in helping to beautify the countryside.

It is a vigorous growing mainly erect shrub often growing to a height of 8 to 10 feet. It flowers freely during the month of May with large flat trusses of flowers usually 3 to 4 inches across, the flowers are white and fertile. During August and September it rarely fails to bear large bunches of red berries turning to black, whilst its rounded leaves often assume brilliant autumn colouring.

Its main value would appear to be to serve as a vigorous root stock which is often used for the rapid production of more choice but slower growing varieties.

There are of course many more beautiful varieties of the Viburnum genus than the ones mentioned, particularly those chiefly renowned for their autumn berries and foliage. I have, therefore, purposely confined myself to the varieties which should easily be obtainable and those which I consider would with reasonable care give general satisfaction and thrive in most gardens.

THE CHRYSANTHEMUM EELWORM AND ITS CONTROL

By G. Fox Wilson

(Entomologist, R.H.S. Laboratory, Wisley)

THERE exists an ever-increasing demand from Fellows of the Society for information relating to the treatment of Chrysanthemums infected with the Leaf Eelworm, *Aphelenchoides ritzema-bosi* Schwartz, that produces the condition known as " Black Leaf " or " Leaf Blotch " in Chrysanthemums.

It is not intended to discuss the biology of the Eelworm here for such information is available elsewhere (*National Chrysanthemum Society's Year Book*, 1945, pp. 17–33), but to provide a simple operational guide to the Warm-Water Sterilization of infected stocks.

Host plants.—This Eelworm attacks a variety of plants, including varieties of *Chrysanthemum indicum* and of *sinense*, *C. rubellum* (Fig. 144), Pyrethrum, perennial Aster, and *Verbena venosa*, while Groundsel (*Senecio vulgaris*) may serve as a wild host of the pest.

Signs of Attack.—The leaves of Chrysanthemum attacked by this microscopic pest become blotched, being at first greenish-yellow, then brownish, later black. Eventually the leaves die from the base of the plant upwards, hang down on the stem (Fig. 144), or fall to the ground giving the plants an unpleasing " leggy " appearance.

Eelworm infection of the leaves is definitely identified only from a microscopical examination of the affected leaves. Confusion may arise by incorrect diagnosis of the signs of attack for other factors may produce symptoms that resemble closely those due to Eelworm infection. Nutritional deficiencies arising from unfavourable soil or unbalanced feeding; cultural defects due to overcrowding, faulty watering and ventilation; and the effect of incorrect sterilization both of the dormant stools and of the compost may give rise to premature leaf-fall, bronzing and/or yellowing of the foliage, and to marginal yellowing of the young leaves.

The effect of good cultivation and balanced feeding on the plants is to mask the effect of the pest, and such plants, though only slightly diseased, may serve as "carriers" and thus provide focal points of infection to neighbouring clean plants.

Control.—The most effective method of cleaning stocks of this microscopic pest is Warm-Water Sterilization, and the following operations (Tab. 1) are briefly outlined to enable growers whose plants are infected to eradicate the pest completely provided certain conditions are faithfully carried out, or to reduce the degree of attack to a minimum.

(1) *Cut down and burn infected stems.*—The old stems are cut down to within 3–18 inches of soil level—the length of stem remaining being dependent upon the "nature" of the variety. Some varieties produce basal cuttings freely, either as "close buds" produced near the base of the stem, or as partial "runners." Others are shy of throwing basal cuttings, and the grower will then have to depend upon stem cuttings for propagation. A number of varieties throw both basal *and* stem cuttings, in which case the former are chosen in preference to the latter. Among those varieties that are propagated chiefly from stem cuttings are 'American Beauty,' 'Friendly Rival,' 'Harmonius,' 'Jane Ingamells,' 'Monument' and its sports, 'Stella,' 'Wendy' and 'Yellow Gown.'

(2) *Lift stools and wash roots.*—The stools should be thoroughly washed clear of all soil taking special care to dispose of the "washings" into a sump-hole or open drain to avoid contaminating the soil with eelworms washed from the base of the plants on to ground in which Chrysanthemums, Pyrethrums and other susceptible plants are subsequently grown.

(3) *Drain stools.*—The washed stools should be drained, and then place in wire-mesh baskets prior to their transference to the Warm-Water Bath.

(4) *Immerse the stools in the Warm-Water Bath.*—Care must be taken to see that there is sufficient water in the bath to allow for *complete* submergence of the plants. The stools are immersed in water at a constant temperature of 110° F. for 20–30 minutes according to their size. The period for treating early-flowering Chrysanthemums is November-December, and January for the late-flowered and Japanese varieties.

While there are a limited number of Warm-Water Baths available on the market, the initial cost of such specially constructed, thermostatically controlled apparatus is too high for many amateur growers to contemplate purchase. There are some who are fortunate in being able to have their plants sterilized by local commercial growers and by the County authorities. Others have devised home-made baths and have obtained excellent results by arranging different sized dustbins, galvanized baths or large biscuit tins to fit one inside the other thus enabling the manipulator to maintain a constant temperature within the inner container in which the stools are placed. While the efficiency of home-made baths may leave much to be desired, to refrain altogether from attempting any form of sterilization through lack of the ideal apparatus is unwise and a short-sighted policy. In order to render a home-made apparatus serviceable and efficient, it is necessary to allow for a high volume of water in the inner bath in proportion to the mass of plant material to be treated ; to stir the water periodically to allow free circulation around the stools thus avoiding both " cold " and " hot " spots ; to maintain an even temperature inside the inner container without rapid fluctuations ; and to use an accurate tested thermometer.

(5) *Remove stools and plunge into cold water.*—After the required period of immersion in the bath, the stools are removed and plunged into a tub of cold water for a few minutes to cool. The tub must be kept for this purpose, and *not* for washing unsterilized stools prior to treatment.

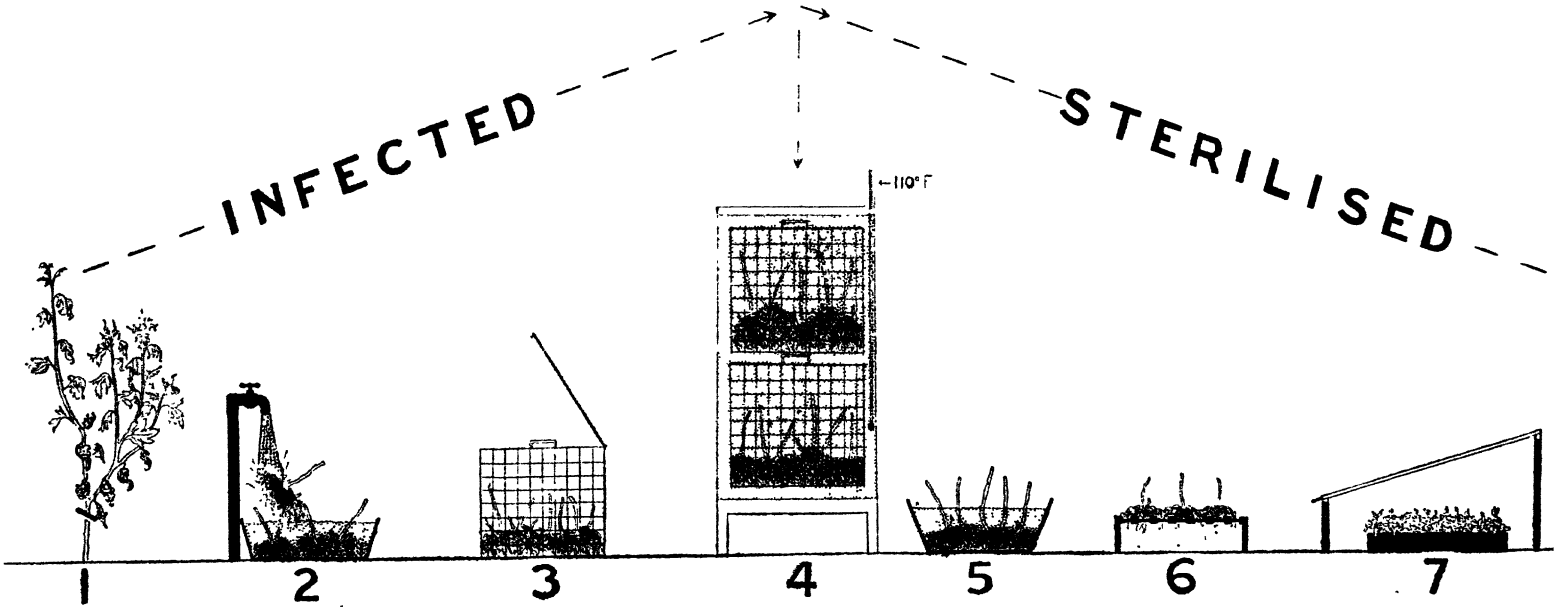
(6) *Drain stools.*—The stools are removed from the cold water tub and placed on racks or a draining-board to drain, and *never* on the ground upon which unsterilized stools have stood or are thrown prior to sterilization. Such draining racks must be kept for the sole purpose of draining sterilized plants. Contamination of sterilized stools is accomplished so easily in the small confines of a garden shed by throwing the incoming infected stools in some place later to be occupied by the treated plants, and dead leaves that fall from the stools after washing the roots clear of soil may be responsible for undoing all the work of the operator.

Operations 1, 2 and 3 are concerned with *infected* plants, while those of 5, 6 and 7 are concerned with *sterilized, eelworm-free* stocks.

(7) *Place the stools in clean boxes and soil.* After the stools are drained clear of water, place them in clean boxes and cover with sterilized soil or composting media. Stand the boxes *under cover* of a frame, or place the boxes in a glasshouse, shed or attic. Some considerable loss of plants may result if sterilized stools are planted in the open ground or stood outside where they will be subjected to autumnal frosts.

Special care is necessary in carrying out post-sterilization operations. For instance, the staging of glasshouses and the floors of garden frames may be responsible for re-infecting the treated stools ; and the boxes, baskets, crates or wheelbarrow employed for bringing diseased plants to the sterilizing outfit will likewise prove to be sources of re-infection if such are used for removing the sterilized stools from the bath.

The appearance of the plants within a fortnight of sterilization is somewhat disconcerting to the grower inexperienced in Chrysanthemum-stool sterilization, for the leaves of the basal growths become flaccid, turn brown, and have the appearance of dead plants. The treated



TAB. 1—Warm-Water sterilization of Chrysanthemums.
(See pp. 365–6)

stools recover within 3–5 weeks depending upon the time of treatment, the variety, and the subsequent treatment of the boxed stools.

There is some retardation in growth, and a period of 12–15 days delay in the throwing of cuttings by sterilized stools occurs. The later (January) treatments exert a longer retarding effect upon the growth of treated stools than the earlier (October-December).

The mortality rate in the case of sterilized stools may be high in cases where the degree of infection was severe prior to treatment, owing to the greatly reduced vigour of the stock plants. It is again stressed that many will be killed when the Warm-Water treated stools have to undergo the shock of being planted in exposed open situations.

Any disregard of the aforementioned operational technique will result in partial or complete failure to control the pest, and will bring discredit on the treatment.

While it is possible to sterilize *rooted* cuttings in the Warm-Water Bath, provided that the aerial portions *only* are immersed and the roots are wrapped in damp cotton-wool or clean moss, it is unwise to treat unrooted cuttings.

Cuttings that are taken from sterilized stools will be clean and free from eelworm infection. It is necessary to plant the subsequent plants in *fresh* ground in which neither infected Chrysanthemums, Pyrethrums nor other host plants have been grown for a period of three years. Great difficulty is experienced in small gardens in arranging a rotational cropping plan whereby to ensure that eelworm-free plants are not grown in infected ground for so long a period. The methods to be adopted in such cases will depend upon the number of plants grown and the time available to carry out certain of the following operations which are subsidiary to Warm-Water Sterilization.

Other Methods of Control.—Avoid any overcrowding of plants both in the open garden and in glasshouses to prevent leaf infections arising from overlapping foliage. The eelworms travel with ease in a film of moisture from leaf to leaf, into which they enter through the stomata or breathing-pores. A single diseased plant may prove to be a focal point of infection, and the pest may spread rapidly in closely packed plantings when the atmospheric humidity is high and the plants are covered in moisture.

Greasebanding the base of the stem early in the season with a narrow band of petroleum jelly will prevent the upward migration of the eelworms on the outside of the stem from the soil into the basal leaves. Plants thus treated will remain clean throughout the season provided always that the grease is renewed as stem growth increases, and that natural " bridges " are not formed by soil splashings and fallen leaves over which the eelworms may pass.

Spraying the plants thoroughly and forcefully at fortnightly intervals from April to September with a Nicotine wash to which a spreader is added, will destroy many of the eelworms as they ascend the stem and move from leaf to leaf on their upward migration. This wash will have no effect upon those eelworms and their eggs that are *within* the leaf tissues. The wash should be directed to *both* surfaces of the foliage thus controlling outbreaks of other pests, notably Aphides, Leaf-Hoppers, Capsid Bugs (Tarnished Plant or "Bishop" Bug), Chrysanthemum Midge, and Leaf-Miner.

Take cuttings from the terminal portions *only* of pot-raised cuttings. Such cuttings will remain clear of infection provided that they are taken *before* the ascending eelworms have reached the terminal shoots, and that such cuttings are inserted in clean soil and do not become infected by contact with adjoining diseased plants.

Remove and burn all infected basal leaves *early* in the season, and as soon as they are detected before such time as the eelworms have invaded the upper leaves.

Investigations are progressing in this country and elsewhere on the control of this pest by methods other than Warm-Water Sterilization, and include the application of radio waves and other forms of radiation to dormant stools and the employment of "Systemic" insecticides whereby certain chemicals toxic to nematodes and other pests are applied to the soil, absorbed by the roots, and conveyed in the "sap stream" thus destroying those organisms that feed on and in the tissues of leaves and buds. Growers are advised to await the results of such investigations before attempting to carry out this latter form of control, owing to the extremely poisonous nature of the chemicals employed and the possible danger to food crops grown in treated ground.

Acknowledgments.—The author desires to express his sincere thanks to his colleague, Mr. F. C. BROWN, for the photograph; and to his assistant, Miss J. MAYNARD, for the drawings illustrating the operational technique of sterilization.

INJURY TO ASTER SEEDLINGS BY THE LEAF CURLING PLUM APHIS (*Anuraphis helichrysi* Kalt.)

By I. Thomas

(Plant Pathology Laboratory, Harpenden)

NURSERYMEN are from time to time troubled by a crinkled condition of Aster seedlings the cause of which does not seem to have been recorded. Typically crinkled specimens were received from Dr. W. M. WARE in June 1946 (Fig. 143.) A few greenflies (*Anuraphis helichrysi* Kalt.) were found on the plants, feeding in the folds of the very young leaves. It was thought that this type of feeding might have been responsible for the crinkled condition of the plants and it was decided to use this aphis in what were intended to be a few preliminary observations.

Aster—variety 'Ostrich Plume' (white) was sown under glass on June 25, 1946, and pricked out singly into pots on July 16. It was intended to infest four plants with *A. helichrysi* from Asters with typical crinkle symptoms, four with *A. helichrysi* from another source (Chrysanthemums), and leave four uninfested as controls. Unfortunately a few plants became accidentally infested with *Thrips tabaci* Lind.* and, two other aphides being found in small numbers on crinkled plants, it was decided to infest two of the controls with these species.

Four aphides (adult apterae or larvae) were transferred to each of the plants to be infested on July 19, each under a separate insect-proof cover. On July 24 the *A. helichrysi* had settled down right at the centre of the plants and were reproducing in the young folded leaves. The other two aphides (*Macrosiphum solanifolii* Ash. and *Aulacorthum solani* Kalt. = *pseudosolani* Theob.) were much more scattered over the plants. Typical Thrips symptoms were visible on the young leaves of the Thrips-infested plants at this date. All plants were now out of doors, the weather being particularly cool for the time of year. The individual covers were removed on July 31.

M. solanifolii and *A. solani* produced similar but much less intense symptoms. By September 1 predators and parasites had cleared up the aphides on the infested plants and all the young leaves were clean; this appears to be typical of growers' experience who maintain that the plants eventually " grow out of it."

A. helichrysi, the leaf-curling plum aphis, migrates in early summer to numerous Compositae and although other aphides may cause similar symptoms, they are not likely to be so intense unless the species in question feeds and reproduces in the very young folded leaves.

Even though these observations were intended to be preliminary, the data eventually obtained showed clearly that *A. helichrysi* can be responsible for the crinkled condition of Aster seedlings which is frequently troublesome to nurserymen.

The findings are supported by observations made, but not published, by Sir JOHN FRYER some fifteen or twenty years ago. In this case, Aster plants which had been dipped in nicotine solution and sprayed remained symptomless whereas others developed the typical crinkled condition.

As a practical measure it is suggested that Aster seedlings be kept as free as possible from all aphides by the routine application of a nicotine spray, or possibly in the early stages by nicotine fumigation under glass. It requires very few aphides to produce severe symptoms, and it would be of little use to spray after the first crinkle symptoms are seen because by that time many young leaves would have incipient damage.

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* Kindly identified by Dr. G. D. Morison.

NOTES FROM FELLOWS

Cornus Kousa var. *chinensis*

At the R.H.S. Show on June 17, among the shrubs in the competitive classes two forms of *Cornus Kousa* were shown. They were both named *C. Kousa* var. *chinensis*. According to the books, BEAN and REHDER, there are two varieties of *C. Kousa*; one from Japan and Korea, and the other from the province of Hupeh in China. There seems to be very little difference in a botanical sense between them, though REHDER suggests that the Chinese form sometimes lacks the axillary tufts of hairs beneath the leaves. In the specimens I have seen, the Chinese form has these tufts of hairs. The main difference from the gardener's point of view is the larger leaves and larger bracts of the Chinese form. The length of the leaves and bracts in both forms are much the same but the breadth of the leaves and bracts are very considerably larger in the Chinese form than in the Japanese form; the bracts are nearly 2 inches compared to 1 inch, and the leaves 1¾ inches compared to 1¼ inch. I think the Chinese form is somewhat later to flower than the Japanese form. The Chinese form is a first rate garden plant, perfectly hardy and easy to grow in any good soil with or without lime.

F. C. STERN, F.L.S., V.M.H.

Rosa Ecae

A fillip has been given to the cultivation of yellow Roses in late years by the introduction of *Rosa Hugonis* from Western China and of numbers of Pernetiana hybrids now available. I venture to court criticism by suggesting that *R. Ecae* (Aitchison), Fig. 138, should be included amongst the most beautiful, hardy and easily grown yellow roses. The plant illustrated is a sucker from a plant raised from seed sent to the late Mr. C. F. BURROUGHS, Luffenham, Rutland, by Dr. AITCHISON, who named the plant for his wife, her initials being E. C. A. He found it in Afghanistan in the Kurrum valley and introduced it to Kew in 1880.*

The specimen here reproduced was planted in October 1939, against a south wall in the ordinary soil of the garden which is 460 feet above sea level, a red sandy loam over ironstone, with perfect drainage. It is now some 10 feet high and as much through, of erect, slightly arching habit, and each year bears a generous crop of solitary deep golden or butter-yellow flowers, when expanded about as big as a florin. It suckers freely which makes propagation easy. I have never seen it set fruit.

There is some confusion between *R. Ecae* (Aitch.), *R. xanthina* (Lindl.) and *R. Primula* (Boulenger), the reason for which is not apparent if the first and last and the three or four forms of Xanthina are compared in the collection at Kew—provided that Bean's acceptance of LINDLEY'S and AITCHISON'S naming is allowed.* Four characters distinguish *R. Ecae* (in the specimen illustrated and all those so-named at Kew)—the shoots of the year are shining mahogany-brown ; the thorns are narrow, about ¼ inch at the base ; the leaves, which are not aromatic, are not more than ¾ inch, the leaflets one quarter, the flowers two-thirds the size of those of *R. xanthina* and its forms and *R. Primula*. In the last-named plants the shoots are green or green flushed brown, and the thorns at least ½ inch wide at the base. This latter characteristic is perhaps the most notable.

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* W. J. Bean, "Trees and Shrubs Hardy in the British Isles," Vol. II, p. 425.

Some six or seven years after the publication of his Manual,† I gave Mr. REHDER, when he was visiting this country, material of AITCHISON'S Rose. In his 2nd edition, p. 431, he clears the nomenclature, only omitting mention of the narrow-based prickles in his description of *R. Ecae*, a character clearly shown in 'The Genus Rosa,' p. 277, by Miss WILLMOTT, in a beautiful figure.

R. Ecae is a lovely elegant shrub, as easy and happy in other parts of the garden at Lamport as in that described above and also in the very different black, sandy soil of Knap Hill. Though difficult, so far, to root from cuttings, the freedom with which it suckers makes propagation easy and leaves no excuse for the pernicious vice of budding. The photograph was taken about May 27, 1947, at least ten days after the plant is normally at its best.

R. C. JENKINSON,
Lamport Grange, Northampton.

Agaves at La Mortola

The photograph of the rare Agave, *A. applanata*, may be of interest to your readers. Alas ! it is the only specimen we have, and it has been there for 40 years without flowering ! Now we are hoping to collect seed. Another interesting Agave, of which I enclose a photograph is a Mortola garden hybrid of *Agave Franzosinii* and *A.* ? . It is a striking improvement in shape and form on *A. Franzosinii*. Its very long pointed narrow silver leaves, are beautifully set in a clean, upward symmetry, instead of the wide, mostly curved leaves of the original. Both our only two plants are flowering, so again we are dependent on seed, as this hybrid does not reproduce itself by small plants round the base of the parent plant. (Figs. 141, 142.)

Single yellow Banksia Roses have flowered in abundance this Spring. Last year, when I started on the task of remaking the garden after the heavy war damage caused by shelling, etc., I thought they were mostly dead. So we cut them back to the ground, 'Fortune's Yellow' Rose and the yellow *Cesalpina sepiaria* were treated in the same way, and have all responded magnificiently. The Cesalpina has flowering shoots already 40 feet long !

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* W. J. Bean, "Trees and Shrubs Hardy in the British Isles," Vol. III, pp. 444, 445.

† Alfred Rehder, "Manual of Cultivated Trees and Shrubs."

I am still hoping for plants of *Brachychiton acerifolium* with its gorgeous scarlet flower; my only tree is badly damaged and I've temporarily lost a great favourite of mine *Brunfelsia calycina.* The garden has made wonderful progress, but we still lack some of the newer and rarer shrubs; most of them died from years of drought and no watering.

DOROTHY HANBURY,
La Mortola, Ventimiglia, Italy.

The Scent of Mimulus moschatus

In 1941 I was visiting Miss CLAYDEN of Parkstone, Dorset, when she showed me some pots of seedlings of *Mimulus moschatus* about 1½ inches tall which exhaled a distinct fairly strong scent of Musk quite reminding me of the Musk plants I knew so well in 1860 and 1870 when every cottage garden had clumps of this plant. When these seedlings attained the height of 4 to 6 inches the scent completely faded out. I took some of them to my garden at Kew but the scent was gone, never to reappear.

HENRY N. RIDLEY, F.R.S.

AWARDS TO PLANTS IN 1947

Androsace imbricata. A.M. April 22, 1947. A native of the Southern Alps, favouring sunny, dry, granite cliffs, the pan shown received both an A.M. and a Cultural Commendation. It forms dense grey cushions of tightly packed small leaves less than ¼ inch in length, almost covered in the pan exhibited by the numerous small off-white flowers each ¼ inch in diameter with a small but easily seen yellow eye. Exhibited by Messrs. C. B. Saunders, Husseys, Green Street Green, Farnborough. (See p. lviii.)

Draba bryoides imbricata. A.M. April 22, 1947. A native of the Caucasus with minute leaves less than ¼ inch in length in small tightly packed rosettes, which form dense cushions of a pleasing greyish green. Flowers yellow, slightly more than ¼ inch in diameter, carried several together on a short stalk 1½–2½ inches in length. The tightly packed cushion will probably require protection from excessive damp during the winter when planted in the rock garden. Exhibited by Messrs. W. E. Th. Ingwersen, Ltd., Birch Farm Nurseries, East Grinstead. (See p. lviii.)

Gentiana pumila. A.M. April 22, 1947. A European species resembling a small and loose, narrow-leaved *G. verna.* Two pans where exhibited, one in full flower and the other just opening its first buds. The basal leaves are about ½ inch in length, linear-lanceolate and taper to a point, the flower stems have up to three pairs of smaller leaves, calyx tube ¾ inch with purplish-brown markings on the wings. The corolla tube is 1–1¼ inches in length and the flowers have a strong resemblance to *G. verna* in both shape and colour. Exhibited by Mrs. C. B. Saunders and Gilbert White, Esq., Chinthurst, Warboys Road, Kingston Hill, Kingston, Surrey. (See p. lviii.)

Phalaenopsis 'Marmouset.' A.M. February 18, 1947. A very pretty addition to the genus. The spike bore thirteen well-formed flowers of uniform rose colour, with minute spotting on the basal area of the labellum. The parents were *P. Schilleriana* and *P.* 'Ninon.' Raised and exhibited by Messrs. Vacherot-Lecoufle, Boissy St. Léger, Seine et Oise, France. (See p. xlviii.)

Primula aureata. A.M. April 22, 1947. An unusual member of the Petiolares section, having orange-yellow flowers. A perennial farinose plant, with leaves fairly heavily covered with yellow farina 2½ inches in length at the time of flowering, probably lengthening later, margins irregularly and deeply dentate. Flowers 1 inch in diameter, outer edge of the petals tending to recurve with age, the centre colour deep orange-yellow which extends outwards for about half the length of the petals before fading to pale primrose yellow or cream. Exhibited by Mrs. Crewden, Helne Lodge, Kendal. (See p. lviii.)

Primula × scapeosa. A.M. March 18, 1947. A very lovely hybrid of the Petiolares section between *P. scapigera* and *P. bracteosa,* raised by the exhibitor.

Leaves all sessile, up to 3 inches long at the time of flowering, dark grey above, greyish beneath, farinose; margins wavy and dentate or doubly dentate. Flowers on 1 inch pedicels when fully open, calyx very slightly farinose, with a faint grey edge to the sepals. Corolla tube ½ inch long, flowers 1½ inch in diameter, colour solferino-purple (H.C.C. 26/2) with a prominent yellow eye ¼ inch in diameter surrounded by a clearly marked white ring. Exhibited by Mr. R. B. Cooke, Kilbride, Corbridge, Northumberland. (See p. lii.)

Prunus Incam var. **'Okamé.' A.M.** April 15, 1947. This lovely, small-flowered Cherry was raised from a cross between two Japanese species, *P. incisa* and *P. campanulata.* The dainty, cup-shaped flowers, which are produced in stalked clusters of three before the leaves open, have red pedicels, dark maroon-crimson calyces, and ovate, notched petals of Fuchsine Pink (H.C.C. 627/2). Exhibited by Capt. Collingwood Ingram, The Grange, Benenden. (See p. lvi.)

Tulip 'Sparkling Eye.' A.M. April 15, 1947. A large flowered variety which, when fully expanded, has a spread of about 6¾ inches, borne on a sturdy 9-inch stem. The ground colour is Empire-yellow (H.C.C. 603/2). The outer segments are flushed outside with Claret-Rose (H.C.C. 021/1) except for a narrow margin of the ground colour. The outside of the inner segments are faintly flushed with Claret-Rose. The inside of the base of each segment is Buttercup-yellow (H.C.C. 5/1) overlaid with brownish streaks, passing upwards to a band of Indian-Orange (H.C.C. 713), the upper half of the segment being Empire-yellow faintly flushed down the centre with Claret-Rose. A selected form from imported bulbs, introduced by Mr. M. Thoolen, Overween, Holland, and shown by Messrs. R. Wallace & Co., The Old Gardens, Tunbridge Wells. (See p. lvii.)

BOOK NOTES

"Lilies for Every Garden." By Isabella Preston. 144 pp. Illustrated. $2.00. (Orange Judd Pub. Co., Inc., New York.)

A book on Lilies and their cultivation by Miss Preston will be welcomed by all who grow Lilies. Miss Preston is well known for her successful cultivation of Lilies at the Plant Breeding Central Experimental Farm at Ottawa, and for the hybrid Lilies she has raised. Several of her hybrid Lilies such as 'George C. Creelman,' 'Lilian Cummings' and 'Lyla McCann' have been grown for some years in English gardens and very beautiful they are. This book is written mainly for the gardener in Canada and the United States, but it is equally useful to gardeners in England. It is seldom that a gardening book is written by such a successful and practical grower, which gives answers to many of the practical problems of cultivation. The chapter on "cultivation" describes her own experience of how the bulbs when first received should be treated and how the ground for growing Lilies should be prepared. The chapter on "propagation" is full of interest and particularly is the part about the saving of seed. The saving of Lily seed and when to transplant the seedlings has always been a controversial subject, so the experience of Miss Preston and her description of how other successful growers deal with their seedlings will be of great value not only to the amateur but to the professional grower as well. The chapter on "hybridization" is quite the best article on the subject of crossing Lilies that I have come across. Miss Preston is one of the most successful hybridizers of Lilies. All her hybrids are described in the second half of the book. This list of varieties is particularly useful as it gives descriptions and history of many new hybrids produced in the last few years in Canada and the United States. Pot culture and pests and diseases are also dealt with. It was news to me how destructive the millipede can be with Lilies and he is given a very bad character. Miss Preston's book is recommended to all Lily growers and my only regret is that it is not longer and that the publishers have not given proper art paper for the illustrations of so important a book.

F. C. STERN.

"Peach Orchards in England." Justin Brooke. (Faber & Faber, Ltd.) Illus. 86 pp. *7s. 6d.*

The subject of this book is a new one to commercial growers, although there are many more or less isolated peach trees growing in the open, some of which have in certain seasons been successful probably depending upon the site being practically free from late spring frosts—a situation clearly stated herein to be essential.

The book is a record of a small planting of 28 Peach trees in 1936, giving the crops obtained each year and the system employed. These crops were sufficiently good to persuade Mr. Brooke to plant nearly forty acres and readers will be interested to hear in due course of the results. It is well known that in some years when other fruits have been injured by frost, peaches have come through, probably owing to the fact that having blossomed so much earlier the fruits had got past the vulnerable stage. Last year (1946) was an illustration of this occurrence. In view of the fact that peaches are successfully grown in climates having a more severe winter such as Canada and the United States, the author rightly considers that they should be at least equally successful in England as those countries also suffer from spring frosts in some seasons. He points out that the peach has a longer flowering period than most other fruits so that one or two sharp frosts in April may not necessarily destroy all the blossoms.

Most of the cultural recommendations conform generally to very many commercial orchards of other fruits, but it is not always considered necessary with apples, for instance, to provide a planting distance wide enough to allow the passage of a lorry between the rows. Sledges take up far less space and ride very much more smoothly. Diseases and pests are dealt with and are refreshingly few. Presumably by "colloidal copper sulphate" bordeaux paste is meant for the prevention of fungus diseases.

As regards grading and packing, there may be two opinions as to whether this is paid for by the consumer and it is doubtful if "Government marketing schemes" entirely ignore the needs of the consumer. It may be argued that better grading and packing is undertaken for the very purpose of giving the consumer better fruit and in the best condition. "Costs and Returns" are somewhat sketchy and most of the costs are not given.

However, the book is most interesting and suggests to both growers and amateurs a crop which is well worth trying. After reading of Mr. Brooke's pioneer efforts many growers will certainly try and do likewise provided that they possess the requisite frost-free site. It is a noteworthy contribution to commercial horticulture and deserves careful consideration and study.

W. P. SEABROOK.

" The Earth's Green Carpet." By Louise E. Howard. 219 pp. (Faber and Faber.) *8s. 6d.*

The author, who was at one time Chief of the Agricultural Service of the International Labour Office in Geneva, has set out to describe in non-technical language the main principles of her husband's, Sir Albert Howard's, reform of agricultural and horticultural practice by producing by methods of composting a rich humus for the growth of plants. Of recent years, owing to the difficulty of obtaining horse manure, considerable attention has been paid by horticulturists to getting a substitute by using all manner of vegetable refuse and encouraging its fermentative decay. Lady Howard gives in one of the appendices details of the best methods of procedure. In the earlier part of the book she insists on the importance of mixed farming so as to maintain the fertility of the soil by a sufficient supply of animal manure. She also gives a good deal of information as to the supreme achievement of the Chinese practice of horticulture, where the natural fertility of the soil has been preserved for centuries. Her accounts of the interdependence of the vegetable and animal kingdom makes the relationship of the two very clear, and she indicates that where there is a proper balance of the two there is no need for chemical or artificial manures. She goes beyond this, and believes that even if man does not realize that the crops manured with artificials " lack flavour " the majority of animals, possessing a more natural instinct, prefer the plants raised with compost. She gives instances of cats which refused to eat boiled potatoes grown with artificial manures and cows which would not graze on fields which had received a dressing of artificials. She refers also to a case where the infant mortality among poultry fell from over 40 per cent. to less than 4 per cent. when farming practice became based on the use of compost.

Referring to the experiments carried out at Indore by Sir Albert Howard, she relates how he first dealt with the soil, which he brought up to the highest standard of fertility by the use of properly prepared compost, and thereafter, in spite of the protests of colleagues, would use no insecticides or fungicides, no tar oils, sprays or sulphur washes. The plants could and would defend themselves.

The fertility which we should be conserving in our crops by the use of a well-fermented and biologically active compost will, she tells us, be passed on as health in our crops, our animals, and ourselves.

F. E. W.

"Plant Life of the Pacific World." By Elmer D. Merrill. (The Macmillan Co., New York, 1946). $3.50.

This book presents an extremely valuable introduction to the plant life of the Pacific region. It is the result of extremely wide experience and knowledge, and Professor Merrill has the happy faculties of being able to generalize without losing sight of detail and accuracy and also of being able to compress a very large amount of information into a very reasonable length book without losing the reader's interest. There are brief introductory chapters on the safe forests and jungles of the Tropics and on the general principles of Botanical classification, followed by chapters on the Plants of the Sea-shore, the Mangrove forest, the Secondary forests and open grasslands and, finally, that glory of the tropics, the Primary forest. The chapter on noteworthy plants should bring much interest to the non-botanical resident in the Tropics. This book can be confidently recommended to all those visiting the Pacific for the first time or to those residents in the Pacific region who would like to know a bit more about the plant life around them. It is the kind of book which should make life more interesting.

P. M. S.

" Gardener's Chance." By Roy Hay. (Putnam). Ill. *12s. 6d.*

This is an account written in a rather light vein of the organization and conduct of the " Dig for Victory " campaign which did so much for the food supplies of this country during the war. It presents a good object lesson of the great increases in crops which can be obtained through a publicity campaign backed not only by real enthusiasm but also by the obvious needs of the country. The needs are not very much less to-day and this book suggests many useful examples and methods of obtaining results by voluntary effort rather than by constant controls and legislation.

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JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

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THE SECRETARY'S PAGE

Subscriptions.—Fellows and Associates are asked to inform friends desirous of joining the Society now, that a Fellow or Associate elected after October 1 is required to pay a full year's subscription, which will entitle him to all the privileges of membership until January 1, 1949.

Programme of Meetings.—The following Meetings with Shows will be held during October and November :—

Tuesday, October 7—12.30 P.M. to 6 P.M.
Wednesday, October 8—10 A.M. to 5 P.M.
Tuesday, October 21—12 noon to 6 P.M.
Wednesday, October 22—10 A.M. to 5 P.M.
Tuesday, November 4—12 noon to 6 P.M.
Wednesday, November 5—10 A.M. to 5 P.M.

In conjunction with the Show on November 4 and 5 the British Carnation Society will be holding a Show.

Competitions.—In connection with the Fortnightly Show on October 7 and 8 there will be a Flower Arrangement Competition for professional florists, and at the same time the annual Fruit and Vegetable Show will be held. At the Show on October 21 and 22 there will be a Tree and Shrub Competition. A schedule of the Fruit and Vegetable Show and particulars of the competitions may be obtained from the Secretary.

Lectures.—The following lectures will be given in conjunction with the Shows in October and November. Each one will take place at 3 P.M. in the Lecture Room of the New Hall, Greycoat Street, S.W. 1.

On October 7—" Fruit Growers' Pitfalls," by Mr. R. BUSH.

On October 21—" The Fertility Rules in Fruit Planting," by Mr. M. B. CRANE, F.R.S., V.M.H.

On November 4—"Recent Developments in the Control of Weeds," by Professor G. E. BLACKMAN.

Demonstrations at Wisley.—During October and November the following demonstrations will be given at the Society's Gardens at Wisley, in each case the demonstration on the second day being a repetition of that on the first :—

Vegetable Garden

Wednesday and Thursday, October 8 and 9—Digging, Trenching, Manuring and Composting (2–4 P.M.).

Fruit Garden

Wednesday and Thursday, November 5 and 6—Planting of Fruit Trees and Roses (2–4 P.M.).

National Federation of Women's Institutes' Exhibition and Demonstration.—The National Federation of Women's Institutes will be holding a Handicraft Exhibition and Demonstration in the Old Hall on Wednesday and Thursday, October 29 and 30, to which our Fellows' and Associates' tickets will admit.

Chrysanthemum Show.—The National Chrysanthemum Society will be holding a Show in the New Hall on Thursday and Friday, October 30 and 31. The Show will be open to members of the public from 1 P.M. to 7.30 P.M. on the first day, and from 10 A.M. to 5 P.M. on the second, at a charge of 2*s*. 6*d*. Our Fellows' and Associates' tickets will not admit to this Show, but admission may be obtained on payment at the door.

Distribution of Seeds from Wisley.—Last year the response from Fellows to the appeal for surplus seeds for distribution from Wisley was excellent. It is hoped that once again any Fellows who have such seeds from their gardens, especially of good or unusual plants, will be kind enough to collect them and send them, carefully labelled with the name of the plant, to the Director, R.H.S. Gardens, Wisley, Ripley, Woking, Surrey.

Technical Advice.—A large number of specimens, both of flowers and fruit, are still being received at the Society's offices, for technical advice or for naming. In nearly every case these specimens have to be sent to our Gardens at Wisley and, owing to postal delays, this involves at least another twenty-four or even forty-eight hours' delay before they reach the experts at Wisley. In consequence, specimens become very faded and often useless for the purposes for which they have been submitted. Will all Fellows in future please send such specimens and enquiries of a technical nature to the Director, R.H.S. Gardens, Wisley, Ripley, Woking, Surrey, quoting at the same time the number which is shown on their Fellowship passes.

Wisley Gardens.—Attention is drawn to the fact that the Wisley Gardens will be open to those presenting Fellows' or Associates' tickets on Sundays during October between the hours of 2 P.M. and 5 P.M. only. The Gardens will be closed on Sundays during the months of November to March, inclusive.

Gift of Orchid Paintings.—Mrs. HELEN KENYON, who is the daughter of Mr. THOMAS STATTER, for many years a member of the Council of the Society, Chairman of the Orchid Committee and a prominent orchid grower, has presented the Society with a number of drawings of orchids made by J. L. MACFARLANE for her father. These drawings have been placed in the Lindley Library except for some which are framed and are being hung in various places in the Society's Halls.

Publications.—A pamphlet on the growing of clean fruit has been prepared by Mr. G. FOX-WILSON and Mr. D. E. GREEN of Wisley and can be obtained, price 6*d*., post free, on application to the Secretary.

Botanical Magazine.—We are glad to be able to announce that arrangements have been concluded with Messrs. WATERLOWS for the *Botanical Magazine* to be printed in colour collotype. It is hoped that the first part of the new Volume 165 will be ready in time for Christmas this year and thereafter succeeding parts will be published regularly each quarter. The costs of this process, which should ensure excellent reproduction, will be heavy and so it is hoped that as many Fellows as possible will support the magazine by becoming subscribers, giving subscriptions to their friends and recommending it to others. Each part will contain coloured plates of eleven new plants made from drawings by Miss LILIAN SNELLING and Miss ROSS-CRAIG, together with a comprehensive and authoritative text. An endeavour has been made to increase the cultural details in each part. The *Botanical Magazine* is one of the oldest magazines in the country, having been founded by WILLIAM CURTIS in 1787 and published continuously since then except for certain delays, due to war. The editorship of the Magazine has now been taken over by Dr. W. B. TURRILL, D.Sc., Keeper of the Herbarium at the Royal Botanic Gardens, Kew. Subscription rate to the *Botanical Magazine* has been fixed at £4 per annum or £1 per part, post free, and subscriptions may be sent direct to the Secretary. A prospectus, which will contain a specimen plate, is in course of preparation and will be sent free on application to the Secretary.

WISLEY IN OCTOBER

THIS month the floral displays are eclipsed by the tints of autumn generated in brilliant tones or in dull and sombre hues, some long lasting, others fleeting; perhaps only for a day will they stand decked in colour before the wild weather scatters them and we again see the sky as a background for etchings of leafless branches. This season brings one other great recompense for the advent of colder weather, enjoyed by both visitors and the wild life of the Gardens: many trees and shrubs are hung with a remarkable variety of ripe and coloured fruits; Crab-apples in many shapes and sizes, Berberis with hanging bunches of red or blue berries, Cotoneasters of many kinds, their branches often outlined by the masses of short-stalked fruits, and numerous other shrubs with fruits of varied sorts and sizes.

Amongst the flowers much depends upon the weather. Frost may end the Dahlia display during the last days of September, but the Chrysanthemum trials and the Perennial Asters will be well worth inspecting during this month, while Colchicums, Crocuses and the later Gentians still brighten many corners of the Gardens.

Near the entrance, at the foot of the laboratory walls, *Amaryllis Belladonna* will be in bloom, and close at hand *Nerine Bowdeni* will also be producing heads of pink flowers. These two bulbous subjects both thrive on well-drained sheltered borders in full sun, and brighten the garden at a time when flowers are becoming scarce.

On the Floral Trial grounds the Asters and Chrysanthemums will still be in bloom and on Battleston Hill the species of *Sorbus* have been decked with ripe fruits for several weeks, while the snakebark Maples, particularly *Acer pennsylvanicum*, fade to golden-yellow. Other small trees planted here which colour well include *Parrotia persica* and *Eucryphia glutinosa* (*pinnatifolia*), both represented by larger trees elsewhere in the Gardens, while the golds and browns of the larger Sweet Chestnuts and Oaks form a pleasing contrast with the varied greens of the Rhododendrons. In the long Rose borders a few flowers are still appearing, while here also the many Cherries and other shrubs have assumed autumn colours.

The Rock Garden still contains many of the Gentians and Cyananthus in flower, noted in previous months, besides Polygonums of various sorts, and new arrivals include the golden crocus-like *Sternbergia lutea* and the crimson-scarlet 'Caffre Lily,' *Schizostylis coccinea*, which produces its spikes until late in the month in spite of frost and adverse weather.

The Wild Garden contains many fine specimens of shrubs valued for their autumn colours. *Disanthus cercidifolius* will now be completely clothed in scarlet and crimson, in company with the scarlet and orange of the many Enkianthus and the pure golden-yellow of *Hamamelis japonica* and the smaller *Fothergilla major*, while overhead *Liquidamber styraciflua* changes slowly from orange to scarlet. This tree can be disappointing, as some specimens do not colour well. Of the two large trees planted here, one colours brilliantly while the other scarcely turns from green to brown before dropping its leaves, whether from its situation or from something within the tree we are unable to tell. Across the Alpine Meadow groups of Japanese Maples also provide brilliant colours, and *Pernettya mucronata*, with fruits of all shades from white to deep crimson-purple, will be found here and in the Wild Garden.

Emerging into Seven Acres by the Heath Garden we see one of the best autumn and winter views in the Gardens, looking over the purples and whites of the late Heathers and Lings, freely mixed with the warm russet of the faded flowers of *Erica vagans*, towards the pond dominated by the large, now golden-leaved, specimen of *Salix vitellina* var. *pendula*, while on the left a border of shrubs and small trees specially planted for autumn foliage effects provide a striking display. Seven Acres contains many trees and shrubs in fruit. Crab-apples, including

Malus baccata and its forms, and the many purple hybrid descendants of *Malus Niedzwetzkyana* are carrying heavy crops. Barberries, particularly *Berberis Jamesiana, B. Wilsonae, B. koreana* and the 'Wisley Hybrids,' are freely hung with fruit, and the dioecious 'Sea Buckthorn,' *Hippophaë rhamnoides*, is heavily clustered with orange berries which the birds seem to dislike and leave alone until all the other berried fruits have been consumed, thus allowing the display to continue into the new year.

For those visitors making a fuller inspection, the numerous forms and colours of the Rose species fruiting in Howards Field are well worth the extra walk, returning through the herbaceous borders where several late flowering perennials, including Physostegia 'Vivid,' *Chrysanthemum rubellum* and many varieties of Michaelmas Daisies still prolong the display.

The Azalea Garden contains, besides the brilliant foliage of the Mollis and Ghent hybrids, the collection of autumn flowering Crocus species mentioned last month.

Returning through the Award of Garden Merit Collection, noting the autumn colours of *Hamamelis mollis* and the combination of peeling bark and changing leaves of *Acer griseum*, we enter the Temperate House, where on the benches the many varieties of Pelargonium are still in flower, with several Fuchsia, and numerous pots of Nerines, in shades of pink, scarlet and mauve. The centre bed contains many interesting plants, including *Fuchsia procumbens* with small brownish-green flowers and large plum-coloured fruits, *Cassia corymbosa* with sprays of freely produced yellow flowers and the royal purple *Tibouchina semidecandra* mentioned in a previous note.

The Half Hardy House also has a selection of Nerines in flower, planted in the beds where they have bloomed freely for several years. Here also *Lithospermum rosmarinifolium* will be producing the first of its blue flowers, a display which will continue all winter and well into the spring. Oxalis also thrive in this house and *O. Bourei* produces its bright rosy-red blossoms during this month. The Abutilons at the end of the house have been flowering for many months; like some other hardwooded subjects their freedom of blossoming seems to increase with age, old plants in spite of an annual hard pruning being more floriferous than young specimens grown in pots.

Flowering near the lower end of the Laboratory is the sub-shrubby *Clerodendron Bungei* (*foetidum*) with fragrant heads of pink flowers but a most unpleasant scent when the foliage is crushed.

For those interested in vegetable growing, the trials grounds in Wisley village will be a centre of attraction; trials of Brussels Sprouts, Broccoli and Celery will be maturing this month, and a careful inspection will reveal not only the best varieties in these trials but the best strain of each variety, a most important point in vegetable growing where a level and even crop is of the first importance. Full details of the times of opening of the vegetable grounds were given in our last issue.

UNCOMMON AMERICAN SHRUBS AND PLANTS

By Mrs. J. Norman Henry

(*Lecture given on March* 18, 1947*:* Col. F. C. STERN, F.L.S., V.M.H., *in the Chair.*)

CHAIRMAN: The Royal Horticultural Society is very fortunate this afternoon in having here Mrs. NORMAN HENRY, who is one of the most distinguished horticulturists in the United States. She also, I should think, has discovered more new plants in the United States than anyone else. She has made many expeditions through the Rocky Mountains, right away from Alaska and the far north of Canada, right down the Rocky Mountains into the southern part, I think eleven expeditions in all, and she explored part of Northern British Columbia and Northern Canada that had never been mapped. I may tell you that a high mountain in British Columbia is called Mount Mary Henry, after her. Also, you have heard of the wonderful Alaskan Highway that was built by the American Army in the war. That country was practically unknown except to Mrs. HENRY. The information gathered on her 1935 expedition was the basis for the laying of the Alaskan Highway. But her main plant collecting has been in the south-eastern States of North America, and I think she has made over fifty expeditions into that part of the world and introduced many new plants, of which she will show you some photographs.* I think she is going to tell us more about that part of North America than the other parts. She has also been extremely fortunate (which very few people living to-day have been) in finding a new Lily. Quite lately she found a new Lily in Southern Alabama, near the Gulf of Mexico, which she has named *Lilium iridollae*, and also she has found new forms of *L. superbum*, that wonderful Eastern American Lily.

Mrs. NORMAN HENRY is an amateur horticulturist and botanist and has received the honour, especially for an amateur, of appointment as Research Associate, Department of Botany, of the Academy of Natural Sciences, Philadelphia.

I could go on for a long time quoting to you about her and what she has done and the plants she has grown and the Azaleas she has grown. She is a great authority—but I would much rather she told you herself and I will ask her to address us.

Mrs. J. NORMAN HENRY: I thank you for your kind words, Colonel STERN, they are very heartening, even if I do not deserve all you said.

It is a great pleasure and a privilege to be here this afternoon. I always enjoy talking about our beautiful American flora. I had a long wait before I was able to search for plants, because being a mother with five young children, it was many years before I could do the thing I wanted to do when my children were grown up. I had lived in the city most of my life, my only garden had been "in the clouds." I owe much to the botanists and horticulturists for their books of reference.

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* All pictures were taken by my daughter Josephine in my garden at Gladwyne.

Books such as Colonel STERN has just produced, that marvellous book on the Paeony. It is to such persons that we gardeners owe so much. It is a debt I cannot live long enough to repay.

In earlier years, in order to obtain rare American plants, I sent to Europe for them. Holland, England and also France produced some, for there were many I wanted. Among them was *Rhododendron speciosum*. It had gone over to Europe many years ago and had been used by hybridists to get wonderful colours and the original plant became lost. When I tried to obtain it, there was not one in cultivation in the United States, its home! That gave me an idea and in due time I set out in search of it. I motored about 2,500 miles, tramped many on foot and came back with several plants on my running board. In those days we had running boards on cars, and they were very useful.

Having dug fairly deeply into books, by the time my children had grown up I knew what I wanted to do, where I wanted to go and what plants I wanted to collect.

The first few years I travelled southward along the Atlantic Coastal Plain. Azaleas, Lilies and Trilliums were my special interest, and then after a few years I travelled a little more westerly, to the Piedmont plateau. That took several years more. Usually I would go several times a year, send a car ahead and then I would come overnight by train, to save every minute I could, to spend on the plants and to do the field work, which is rather exacting.

A few more years and then I went further west to the Appalachian Mountains, first the eastern slopes and then the western slopes. These last few years have found me in the mountains of Eastern Tennessee, Eastern Kentucky and the State of Alabama. These mountains are not so high as the Great Smoky Mountains and that fact means that earlier botanists who went to the high mountains had done comparatively little in the outlying mountains. It has been a great joy and a real revelation to find so many wonderful new plants.

Rare and beautiful plants are usually only to be found in places that are difficult of access, because so many flowers are destroyed by passing motorists who pick them freely, alas, and often discard them a few miles further on. In our southern states people are poor and life is hard and there is little cattle feed, and that means that cattle, horses and hogs roam freely in droves. There are no fences, and signs along the road announce " Cattle at Large." Day and night one is apt to strike an animal, as evidenced by the dead ones that are sometimes found along the edge of the road. The fact is that those hungry animals feed on Lilies, Azaleas and other beautiful plants in the swamps. The soil of the " Pine Barrens," covering so much of our south is poor and there is little for the cattle to graze on except where the creeks run through, where growth stays green all summer, so that beside every creek there is a farmhouse, and the result to botanists is appalling.

Plant collecting, as those of you who have done any well know, is not always what one might call smooth going, because to find a spot where men, cattle and hogs have not been, one usually has to go into very rough country and push and shove one's way through briars or wade through creeks and deep bogs, often wriggling on hands and knees, sometimes almost having the shirt torn from one's back. Insects are apt to be unpleasantly plentiful. I will not say any more about discomforts, except that there are stings from many kinds of crawling creatures, which I try to imagine do not exist, but they do bite.

Then there are always the rattlesnakes and there are really giant ones in our southern states. I have learned to kill them. I have a little technique of my own, and it adds immensely to the excitement of the day. My little trench spade, which I procured after World War I, is 21 inches long. I call it my side companion. When I am ready to start on a collecting trip, my chauffeur always sharpens one edge of it and says " Here is your spade. It is sharpened for the rattlesnakes." My method is this. I hold the spade out to the snake, which of course strikes at it, snubbing its nose. After doing this several times, it uncoils and straightens out to escape. It is easy then to reach down and cut its head off, really quite simple. I think it is quite safe, although some people think it is a dreadful performance. Still snakes do add to the interest of the trip. It is necessary to watch more carefully for copperheads, as they cannot announce their presence by rattling. But then, rattlesnakes do not always rattle.

One never knows what may happen on a plant collecting trip. One time, when my daughter JOSEPHINE was with me, we were " held up " by three men all armed with rifles. I had often wondered what it would be like to be " held up," I had read about such things. Now I know. It was not bad at all. It all happened so suddenly we were not a bit frightened. We felt as if we were at the movies. However, the men were very rough and we were far from the road. People tell us we were fortunate to reach the road at all, after the many impolite things they said. It was quite an experience and one more adventure.

Now I am going to show you the pictures of some of my precious plants and shrubs. There are many growing at my home at Gladwyne. It has been an interesting experiment to bring them from such southerly places as Florida and the Gulf of Mexico, to our northerly latitude. Our temperatures in winter go below zero and sometimes the ground is without snow. Temperature after hovering around zero for weeks, in one day may rise to 50°. Our constant freezing and thawing weather makes winter conditions difficult. Although the plants from a warmer clime have a rough time, success in acclimatizing them has been great and I have been able to bring into cultivation some hundreds of new plants. In the last few years I have placed over 100 in the hands of commercial growers.

My plants, as you will see from the pictures of them, are young, because I started at the beginning with seeds or cuttings and it will take some years before they reach maturity, but that is something to look forward to. There is a great thrill about raising plants from seed, I think even close to collecting them.

This first picture is a reminder that we too have winters, with deep snow. We will see the early spring plants first and advance with the seasons until late autumn. This one is the driveway of my home. There is the creek to the right. The picture was taken about the first week in March, just before I sailed for England. All these pictures were taken by my daughter JOSEPHINE, on my home grounds. There is the rock garden to the right and down below, my home, at the foot of the hill. The snow is deep, but we have it like that every year. March is our month of blizzards but we expect them and are prepared for them.

Erythronium americanum grows along a little creek on my place. Nature always does the finest planting.

There are over fifty different Trilliums here. *Trillium nivale,* our earliest Trillium. It always comes before the snow has gone. Only a few inches tall, it is delicately beautiful. *T. erectum,* a special pink form. I have it in numerous colours. The usual colour is red, a beautiful maroon-red (Fig. 149). *T. ovatum,* the double-flowered form which someone kindly sent me from California. It is very pretty, but the most beautiful double form of Trillium I know of is the double form of *T. grandiflorum.* It is just as full, as double and symmetrical as the most perfect Camellia you can imagine, not a bit " stiff " looking, and it lasts long in bloom (Fig. 150). The dwarf white form of *T. Catesbaei* is a new undescribed form, possibly a new species, which I found twenty miles north of the Florida border, the smallest and most delicate little thing imaginable and quite fairylike. It was growing on dry, sandy " Barrens " with scrub oaks and pines.

Fothergilla species, has a height of about 18 inches but it blooms readily when only 1 foot tall. It is stoloniferous in habit but spreads slowly. It is fragrant and comes very early in the year.

Halesias, handsome, interesting, are a comparatively little known family of trees and shrubs. *Halesia parviflora ;* I could throw a stone into the Gulf of Mexico from where I collected this one and yet it stands our sub-zero temperatures with never a frozen branch. It is a beautiful large shrub but is not as showy as the following species. *H. carolina,* with large flowers, grows about 8 feet or more tall and is attractive, graceful and ornamental and should be widely planted. *H. monticola* from the Carolina Mountains (Fig. 148). I have seen this about 90 to 100 feet high. It is a magnificent forest tree and there are none more beautiful. It grows on cool damp slopes and ravines but its head reaches for the sun. The type bears flowers like large snow-white bells. It has a pink form which I raised from seed. It is the best one from many seedlings. The parent plant had pink flowers too, but this seedling has flowers of a much better colour. The buds are crimson and the flowers are pink and remain pink until they fall. Every spring *H. diptera* from the south-eastern Georgia coastal plains is covered with clouds of flowers. They grow so thickly it is impossible to see the branches. It is a small tree rarely reaching over 20 feet in height and is superlatively beautiful.

Styrax americanus. Not quite as showy as its relative, the Halesia, but it bears deliciously fragrant drooping white flowers that are produced abundantly. It grows about 8 feet tall. *S. grandifolius* is a small tree. The flowers are magnificent, with the scent and appearance of orange blossoms.

You see the rock garden. That large rock in the rear is about 15 feet high. It is a natural outcropping. Nature built this rock garden. I did very little except to shift some of the smaller rocks.

Phlox nivalis : I have named this fine variety ' Gladwyne.' According to Dr. WHERRY, the foremost authority on Phloxes, it is the finest dwarf Phlox in existence. The plant is small but, because I have given away so many pieces, it never gets a chance to grow big. The flowers are large, circular and a deliciously creamy white in colour and it is scarcely ever out of bloom. I have photographs of it in flower taken about the first of November (Fig. 153). *P. divaricata Laphami.* This variety I am calling ' Chattahoochee,' because it grows near the Chattahoochee River. The name is an Indian one. The flower is lavender-blue with a brilliant crimson centre. It is a most spectacular plant (Fig. 161). The bees kindly made this next Phlox for me. It is a hybrid of ' Chattahoochee.' I used to disapprove of hybrids because it seemed like tampering with nature ; then the bees and butterflies started in where I " feared to tread " and that gave me the idea of hybridizing too. You do not have to wait long for results. Experts claim that this Phlox is the bluest one in existence. The eye is crimson but the blue is very clear, much clearer even than that in *P. divaricata. P. Buckleyi* is not a new Phlox, but it is the first time it has ever been cultivated. You will notice it is a very beautiful pink, quite free from magenta tints. The foliage too is handsome and distinctive, glossy dark green sword-like leaves. The flower heads are large and it is here in several shades of pink. I have specialized in Phlox because they are so beautiful and useful in the rock garden and have put over twenty-five new ones in cultivation these last few years. *P. stolonifera* ' Blue Ridge ' is one of the loveliest of all Phloxes. Its colour is a beautiful blue. While not so tall as *P. divaricata,* it bears larger, broad petalled and circular flowers. *P. carolina gloriosa.* Described recently by Dr. WHERRY in " Bartonia," this is perhaps the most beautiful wild Phlox in existence. The large circular flowers are carried in huge heads and their colour is a soft bright pink that verges on salmon. The deep green glossy foliage makes ample evergreen rosettes that spread nicely, and are decorative summer and winter. This Phlox grows about 12 to 14 inches tall and is a great addition to our gardens. It flowers freely and blooms far into autumn. *P. carolina gloriosa candida,* a marvellous pure white, and *P. carolina gloriosa lavendula,* pale lavender, are worthy companions.

Dicentra eximia is the common pink one. The next picture shows its beautiful white variety which I call ' White Pearl.' The two planted together are lovely. The foliage is so graceful and so lace-like. It fills in all the nooks and crannies and every gap in the rocks. It has a long blooming season, well over two months, and is as hardy as the proverbial rock.

Crataegus uniflora is a small compact shrub. My specimen after about fifteen years is but 3 feet tall. It is well decorated every spring by white flowers that resemble small white roses and they grow singly.

Aesculus sylvatica at its best grows about 4 to 5 feet tall, with a spread of 6 to 8 feet in diameter. The only thing I can compare it to is a low spreading shrub with masses of hyacinth-like spikes stuck all over them. They come in many shades of red, pink and yellow and are exceedingly handsome and hardy.

Here is a new *Calycanthus*. It is quite a dwarf, slow-growing variety. The pink flowers are attractive, as is also the small greyish foliage. The fragrance is delicious.

Magnolia cordata, our one yellow-flowered Magnolia, is a large shrub or small tree that is highly desirable for its uncommon beauty. *M. Fraseri*, not especially rare but a handsome tree with fragrant flowers. It reaches a height of about 30 feet. *M. Ashei*, one of our most magnificent Magnolias. On first sight I was amazed by the size of its immense flowers, 15 inches in diameter. Sometimes it blooms when only a few feet tall. The foliage is immense too. One leaf will run well over 25 inches long and a good foot or more wide. They are very tropical looking. Although from Florida, it stands our low winter temperatures. The red seed-pods are decorative (Fig. 146).

A close relative of the Magnolia and also a Florida tree is *Illicium floridanum*. The crimson flowers are handsome and the fragrance of the massive evergreen leaves is delicious.

Clematis Scottii rosea, a pink form, very beautiful, was sent to me by a kind botanical friend from South Dakota. It has silvery foliage and grows about 8 inches tall.

Iris verna. This enchanting little Iris I am calling 'Vernal Snow.' I have collected numerous other colour forms of *I. verna* from dark purple to white and pearly pink, also an enchanting little bicolour. They are 'Vernal Night,' 'Vernal Evening,' 'Vernal Simplicity,' 'Vernal Dawn,' 'Vernal Fairy,' etc.

I spent many years collecting varieties of *Amsonia ciliata*, one of our most attractive and unusual plants. The colour is a beautiful French blue without tinge of any other shade. There is an albino variety that is very delicately beautiful. They are excellent growers for dry sunny positions. Another kind has flowers of a wonderfully beautiful aquamarine blue. At the moment it is called *A. ciliata tenuifolia*, but I feel sure it is a new species. *A. cilata tenuifolia alba* 'White Cap.' These Amsonias are all very lacy and fragile-looking, both in flower and foliage and so clear in colour. They are aristocratic cousins of the commonly grown *A. Tabernaemontana*. In autumn, the foliage drapes over the rocks in beautiful shades of russet and gold.

Silene pennsylvanica is a dainty pink-flowered plant with a long-lived root. *S. virginica*, the upper plant in the picture, is one I found and almost fell over the mountainside to get. I dropped to a narrow shelf of rock where it was, and when I got there, I could not get back but had to drop on down about 12 feet. You can see what a beautiful light coral pink it is. I call it *S. virginica* 'Coralie.' *S. Wherryi* are produced abundantly. It grows about 8 feet tall. *S. grandifolius* is a small tree. The flowers are magnificent, with the scent and appearance of orange blossoms.

You see the rock garden. That large rock in the rear is about 15 feet high. It is a natural outcropping. Nature built this rock garden. I did very little except to shift some of the smaller rocks.

Phlox nivalis: I have named this fine variety 'Gladwyne.' According to Dr. WHERRY, the foremost authority on Phloxes, it is the finest dwarf Phlox in existence. The plant is small but, because I have given away so many pieces, it never gets a chance to grow big. The flowers are large, circular and a deliciously creamy white in colour and it is scarcely ever out of bloom. I have photographs of it in flower taken about the first of November (Fig. 153). *P. divaricata Laphami.* This variety I am calling 'Chattahoochee,' because it grows near the Chattahoochee River. The name is an Indian one. The flower is lavender-blue with a brilliant crimson centre. It is a most spectacular plant (Fig. 161). The bees kindly made this next Phlox for me. It is a hybrid of 'Chattahoochee.' I used to disapprove of hybrids because it seemed like tampering with nature; then the bees and butterflies started in where I "feared to tread" and that gave me the idea of hybridizing too. You do not have to wait long for results. Experts claim that this Phlox is the bluest one in existence. The eye is crimson but the blue is very clear, much clearer even than that in *P. divaricata. P. Buckleyi* is not a new Phlox, but it is the first time it has ever been cultivated. You will notice it is a very beautiful pink, quite free from magenta tints. The foliage too is handsome and distinctive, glossy dark green sword-like leaves. The flower heads are large and it is here in several shades of pink. I have specialized in Phlox because they are so beautiful and useful in the rock garden and have put over twenty-five new ones in cultivation these last few years. *P. stolonifera* 'Blue Ridge' is one of the loveliest of all Phloxes. Its colour is a beautiful blue. While not so tall as *P. divaricata,* it bears larger, broad petalled and circular flowers. *P. carolina gloriosa.* Described recently by Dr. WHERRY in "Bartonia," this is perhaps the most beautiful wild Phlox in existence. The large circular flowers are carried in huge heads and their colour is a soft bright pink that verges on salmon. The deep green glossy foliage makes ample evergreen rosettes that spread nicely, and are decorative summer and winter. This Phlox grows about 12 to 14 inches tall and is a great addition to our gardens. It flowers freely and blooms far into autumn. *P. carolina gloriosa candida,* a marvellous pure white, and *P. carolina gloriosa lavendula,* pale lavender, are worthy companions.

Dicentra eximia is the common pink one. The next picture shows its beautiful white variety which I call 'White Pearl.' The two planted together are lovely. The foliage is so graceful and so lace-like. It fills in all the nooks and crannies and every gap in the rocks. It has a long blooming season, well over two months, and is as hardy as the proverbial rock.

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Stewartia ovata, which many people call a hardy Camellia, is a small tree, 18 or 20 feet tall and very beautiful. It stands close to the top where handsome small trees are planted.

Rhododendron alabamense. I cannot understand why it has been neglected in cultivation (Fig. 147). It is a gorgeous shrub, perhaps the most beautiful of all our Azaleas. The fragrance is magnificent. I know of no other Azalea that has such a marvellous fragrance. Its fragrance is somewhat like that of the oriental Lilies. The flowers expand before the leaves and often bloom so profusely that not a twig is visible. The usual colour of the flowers is white with a yellow blotch. Sometimes the flowers are entirely white and rarely there are specimens with pink or apricot coloured flowers. The most beautiful variety I have found is an enchanting pale creamy yellow with a golden-yellow blotch. My daughter was in India and China with the Red Cross for two years so we do not have coloured photographs of some of my finest Azaleas and other plants, too. A double-flowered form of *R. alabamense* is extremely interesting and most handsome.

R. roseum is our very best pink Azalea. It is a fine pink with a hint of salmon and spicily fragrant. A new form of *R. atlanticum* has pink buds that expand to snow-white flowers. The leaves are glaucous grey-green and the stems are carmine. It is one of the most beautiful Azaleas I have ever seen and it is a perfect gem for rock gardens as it grows but 6 to 15 inches tall. *R. speciosum* is another of our beautiful Azaleas which is little known in cultivation. I motored 2,500 miles to procure a few specimens. It flowers so abundantly the stems are hidden by its orange to blood-red flowers, no fragrance, but peerlessly beautiful. I have many wonderful hybrids of *R. speciosum*. There are some swamps in Georgia where they grow, and nearby, a mile away as the crow flies, *R. canescens*, the southern pink Azalea, is growing, so that probably for thousands of years insects have carried pollen back and forth. I have never seen such colour variety as the flowers of these Azalea hybrids. One is of old rose colour; they also come in many shades of yellow, orange and red, often with a strange admixture of pink in the flower. You can see the unusual whitish foliage of this pretty fragrant white-flowered Azalea, probably it is a new variety of *R. canescens*. The foliage is green, but covered by so many long white hairs it appears white.

R. austrinum is about 8 feet tall at Gladwyne. It has been here twelve years. When in bloom it looks almost like a pillar of fire. It is just that colour and is the 'Flame Azalea' of southern Alabama, south-western Georgia and western Florida. One plant has canary-yellow flowers and is marvellously fragrant. It blooms before the leaves, and the long filaments in the blossoms are characteristic and give the flowers a light airiness which is very attractive. *R. cumberlandense* has blood-red flowers, wonderfully brilliant in colour.

The magnificent *R. prunifolium* is probably the handsomest shrub of eastern North America, also with blood-red flowers that are larger than those of our other Azaleas. It fairly took my breath away the first time I saw it in bloom. The largest specimen I found was 12 feet tall and 15 feet in diameter. *R. Chapmani* is our rarest evergreen Rhododendron. It is a dwarf shrub, suitable for rock gardens and thrives in the hottest driest position without a drop of water being given it during the summer. *R. minus*, from the mountains of southern Georgia, has flowers of a luscious clear rose-pink and it too, will stand a hot dry summer. It blooms at the height of only 8 inches. I doubt if it ever grows higher than 18 or 20 inches in our climate, but it spreads into wide little bushes.

This picture is of the outskirts of the Rock garden in Penstemon season. *Penstemon Palmeri* is a lovely pink-flowered species. *P. digitalis*, self sown and the great drift of white stays in bloom for two or three weeks. *P. connatifolius* has flowers of a beautiful carmine shade. *P. cobaea* in the foreground, has magnificent deep royal purple flowers. It also comes in lavender and in pure white. There is a closely related species, *P. triflorus*, with smallish rose-pink flowers. I crossed it with *P. cobaea* and now I have fine large-flowered pink ones. *P. Torreyi* from the south-west, with flowers of glowing coral-red growing just above the grey-green foliage of *Artemisia frigida* from northern British Columbia. The colours harmonize nicely.

Now come the Yuccas. At present they are a puzzle, for no one knows much about our eastern Yuccas, and so it is quite impossible to get many of my plants identified. There are about twenty or more different kinds growing at Gladwyne. Every one is handsome. In some the flowers are outstanding and in others the foliage is conspicuously attractive. Some have flower spikes over 9 feet tall while some only grow about 3 feet high. One variety has enchanting pink flowers. There is very great variation in the width as well as in the stiffness of the leaves. Then, too, the leaf colour varies from dark to pale green and many shades of grey to an amazing blue-green. Really they are a marvellous group of plants and are very beautiful every day in the year.

Tiny little *Tradescantia graminea* is a perfect miniature Tradescantia about 4 inches tall, and prefers a hot sunny spot. I have several colour forms of this. The prettiest one is pale pink.

Vaccinium pennsylvanicum, a stunning little " Blueberry " with white fruits.

Asclepias tuberosa, the " Butterfly Weed," is here in many shades from lemon-yellow to scarlet-red, showy and easily grown in full sun in dry soil. As a cut flower it lasts a long time.

Lithospermum carolinensis from our southern states. The flower is a surprisingly brilliant orange.

Hymenocallis. Nobody knows what species this one pictured is (Fig. 151). I have collected them from over a dozen localities in several states. The flowers measure from 9 to 10 inches in diameter. They look like huge snow-white Daffodils and have a marvellous fragrance. They should be common plants to-day. They are so beautiful, so exotic and ethereal looking and they last long in bloom. Alas! they are rare in gardens.

Melanthium virginicum is a liliaceous plant, about 5 feet high. The flowers last five weeks. They are creamy-white and gradually turn an enchanting shade of green, which is just as attractive as the white. In fact, my daughter and I prefer the green. I have a new species of Melanthium which is more beautiful even than this one.

Lilium philadelphicum. These little Lilies are close indeed to my heart. I have spent years collecting colour forms and now have in my frames a lovely soft buff-yellow variety, also yellow with red spots, lemon-yellow with small black spots, yellow with large red blotches, deep red well spotted and red with yellow heart and no spots at all. One day I took my daughter to an area where I knew there were variations and she found a great prize, a stunning brown flowered Lily which I named 'Brown Berry.' Two other great treasures are 'Sunlight,' a glorious pure unspotted yellow, and 'Black Diamond,' a weirdly and wonderfully beautiful Lily whose blood-red flowers are so heavily blotched with black they appeared a deep maroon from a distance! There are others here of distinction, too. *L. philadelphicum* is the Lily par excellence for the rock garden because it is dwarf growing and also because it is so exquisitely beautiful. *L. canadense,* an attractive spotless pure golden-yellow form, whose pollen too is yellow. It is one of the finest Lilies. I am calling it 'Golden Rule.' This is *L. Grayii,* a rather nice widely opened form.

This picture shows *L. superbum,* what you might call the type colour, as it grows in Pennsylvania. The next variety of this species has very curious and unusual spottings on the flowers. My finest *L. superbum* I call var. 'Norman Henry.' The remarkable colour of this exquisite Lily is clear unspotted butter-yellow. Because of its great beauty, vigour and hardiness, it has been called "one of the most valuable plants in the world" (Fig. 145). Here is var. 'Port Henry,' with flowers of a soft but vivid orange without shading of any other colour. Mr. MACNEIL, famous Lily specialist, says he knows no other Lily with flowers of that particular colour. Var. 'Mary H. Davis' is a lovely pale yellow with blackish spots, ultra refined and lovely. Var. 'Herc Henry' has spotless yellow flowers with scarlet shaded tips of the perianth. It has been much admired. In my Lily seed bed there are quite a variety of pure yellows.

This is an especially interesting *L. superbum* from western Florida. The flower is very different from the usual *L. superbum.* The petals reflex more, which makes the wide spreading filaments appear longer.

The stem is quite stiff and rigid and the leaves are much longer and narrower than is usual in this species. It is quite a magnificent new Lily, and blooms very late in the season, well along in August. Another *L. superbum* from a different part of Florida. You will notice the foliage. It bears little resemblance to that of the other one.

A natural hybrid that I found, between *L. superbum* and *L. Michauxii*. The flowers resemble those of *L. Michauxii* and the leaves look like those of *L. superbum*. These two species grew and bloomed side by side in the Carolina mountains. *L. Michauxii*, a lovely yellow-orange one with a wonderful fragrance (Fig. 155).

L. Catesbaei Longii. There is only one small bog in eastern Virginia where it has been found, and the pigs are running at large there now. Quite likely they have devoured every one. I have quite a nice population of seedlings coming along. It is a fine northern form of *L. Catesbaei*.

And now, because it is my greatest treasure, I have left to the very end the story of my ' Pot of Gold ' Lily. In October 1940 I collected seeds of a tallish Lily in Alabama near the Gulf of Mexico. As far as I knew, no Lily of this sort had ever been found in this area. In February 1941 I planted the seeds. Five of the resulting Lilies bloomed September 1945. Then came one of the big thrills of my life, for they turned out to be a new species ! Because of its golden-yellow colour and also because I feel I have found my ' Pot of Gold ' at the foot of my rainbow, I named this Lily, *L. iridollae*.*

Although my plant collecting tale is far from being told, I have given you a brief sketch of the pursuit of my all absorbing work. I do not feel I have done half so much for the flowers as the flowers have done for me.

A few pictures follow of the mountains, showing the gorgeous colouring of the vegetation in autumn ; also of our horses, our side companions. Here is our tent, our home in the Great Smoky Mountains, where a new domain greeted our eyes with every sunrise. The ground was frozen in this picture, towels, shoes, etc., were frozen, too, and we were far from warm.

After all, in the long run, discomforts matter little in comparison to the wealth of beauty acquired. Truly I feel the " game has been worth the candle " and the garden of my dreams has come true.

NEW AND NOTEWORTHY PLANTS

Rhododendron yakusimanum

RHODODENDRON YAKUSIMANUM Nakai—recently awarded a First Class Certificate when exhibited at the Chelsea Show by the Director of the Royal Horticultural Society Gardens, Wisley —is one of a group of four closely allied species which have been placed in the Ponticum Series, Caucasicum subseries. It comes from Yaku Island and was named by the Japanese botanist NAKAI, who described the new species in the Tokyo Botanical Magazine in 1921 (vol. 35, p. 135). I have seen only one herbarium sheet which was collected by G. MASAMUNE, in June 1928, on a windswept ridge, near the summit of Mt. Yaedake. The type is, or was, in the Tokyo Museum.

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* *See* " Bartonia," No. 24, 1946, c/o Academy of Natural Sciences, Philadelphia. (The description of *L. iridollae* will be republished in the R.H.S. Lily Year Book for 1947 by kind permission of the Editor of " Bartonia."—Editor's Note.)

Each of the four allied species—*R. Degronianum* Carrière, *R. Metternichii* Sieb. & Zucc., *R. Makinoi* Tagg and *R. yakusimanum* Nakai—appears to have its distinctive facies and to have its own restricted distribution, but differences other than habit of growth are by no means well marked. It is therefore not easy to distinguish the species when plants have been dried and preserved; moreover the criteria given in the literature as diagnostic seem to be by no means constant and reliable. At different times I have seen all four species in cultivation but not together and I have had no opportunity of making a close comparison between them. Herbarium material is scanty.

R. Degronianum and *R. Makinoi* have long been in gardens, and *R. Makinoi* is readily recognised by its long, narrowly lanceolate leaves. Most plants in cultivation under the name *R. Metternichii* are, in fact, *R. Degronianum*; the former species has a 7-partite, the latter a 5-partite corolla. The only plant of the true *R. Metternichii* I have seen was at Exbury; it had been obtained by the late Mr. LIONEL DE ROTHSCHILD direct from Messrs. WADA'S Nurseries in Japan. It appeared to be a straggly-growing bush, lacking the compact habit of *R. Degronianum*. Another similar plant from Japan, sent by Messrs. WADA at the request of Mr. DE ROTHSCHILD and Mr. J. B. STEVENSON to Edinburgh, was supposed to be true *R. Metternichii*, and had the same straggly habit but when it flowered it did not have a 7-partite corolla. The corolla was 5-partite as in the three other allied species.

In *The Species of Rhododendron*, p. 581, *R. yakusimanum* is placed along with *R. Makinoi*, as having narrow leaves, but the evidence of such herbarium specimens as we have (an insufficient number for any conclusive finding) is that the leaves of *R. yakusimanum* scarcely differ from those of *R. Degronianum* and are not nearly so narrow in relation to their length as are those of *R. Makinoi*.

R. yakusimanum and *R. Degronianum* are certainly very closely akin, but would seem to differ markedly in their habit of growth, the former, as described by Mr. HANGER, a compact, dome-shaped shrub, about 2 feet 6 inches high and nearly 4 feet across—the latter, a more or less hemispherical, close-growing shrub, 4–5 feet high and of about the same breadth. The flowers of *R. yakusimanum* are in a compact truss and eventually become pure white, whereas those of *R. Degronianum*, usually at least, retain a pinkish tinge.

Without much more material than is at present available, it is not possible to give reliable diagnostic criteria by which the four allied species can be separated, nor is it possible to come to a definite decision as to whether we have, in fact, under consideration four distinct species, or rather only one variable species with a number of distinctive varieties and forms.

All four species are separately listed and described by NAKAI in *Trees and Shrubs Indigenous in Japan Proper* (vol. I, pp. 58–67). He adds, besides, two varieties or forms of *R. Degronianum* and three of *R. Metternichii.*

The text is written in Japanese characters and I am indebted to the Rev. SCOTT MORTON who translated the descriptions and appended notes for me, but my hope that these would furnish further characters for discrimination has not been fulfilled.

The features given to distinguish *R. yakusimanum* cannot be considered as entirely reliable—thickened capsules covered with a brown, velvety indumentum which in other species is continuous, but in this one occurring only in patches.

J. MACQUEEN COWAN.

Rhododendron yakusimanum

Two feet six inches high and nearly four feet through, this Rhododendron carried hundreds of flowers in perfect upstanding trusses which formed a complete dome from the ground upwards. The Rhododendron Committee of the Royal Horticultural Society was unanimous in awarding the plant a First Class Certificate.

This species appears to be most rare in this country and we are indebted to the late Mr. LIONEL DE ROTHSCHILD for its introduction. Always keen to import any new plant, especially unknown Rhododendrons, Mr. DE ROTHSCHILD obtained the first plant from the late M. N. WADA of the Hakoneya Nurseries, Numazushi, Japan. Before the last war this nursery was the source of many garden treasures and M. WADA's catalogue always repaid a handsome dividend for time spent in searching its pages for new and rare oriental plants.

I well remember *R. yakusimanum's* arrival together with many other interesting eastern novelties, including *R. Metternichii* the true form with lovely pink seven-lobed flowers, also a native of Japan.

This first *R. yakusimanum* had only four small leaves when received, but, although tiny, attention was immediately drawn to it because of its distinct appearance. To make certain of establishing this plant after its long journey, it was placed in a small pot and grown under glass and was later planted in the small rock garden on the north side of the then large Rhododendron House at Exbury. When last seen at Exbury about two months ago, the plant was still in the same position, growing well and had become approximately two feet high and about three feet through.

The Wisley plant is a layer from the original introduction, given to the Wisley garden two seasons ago. It seems to have outgrown its parent, appreciating the Battleston Hill soil with a liberal supply of spent hops and water. Planted in a more or less open position it lived through the past winter unharmed, to reward us the following May with an abundance of flowers, with trusses at the tip of practically every growth.

Although this plant with its white flowers commanded appreciation at the recent Chelsea Flower Show, I feel certain that had the plant been seen a week earlier it would have been more beautiful as the buds of the upstanding compact trusses were a rich pink, fading to a pale pink as they developed to be finally pure white when opened.

The Rhododendron Society's book, *The Species of Rhododendrons,* gives us very little information concerning this new species other than the statement that it is figured in the book by Professor NAKAI and Professor KOIDZUMI entitled *Trees and Shrubs Indigenous in Japan Proper.*

R. yakusimanum is a native of Yaku Shima * a small island due south of Kyushu one of the main islands of southern Japan, four to five hundred miles north of Formosa (Taiwan). This island is almost circular, about twenty miles across and very mountainous, the highest peak being about 6,560 feet. It is covered with forest vegetation and the finest Cryptomerias in Japan are said to grow there. The Oriental Gulf Stream passes by its shores and gives it a mild climate. The flora includes a number of endemic species and it is reported that *R. yakusimanum* occurs from 1,600 feet up to the highest peak of the island.

FRANCIS HANGER, CURATOR, WISLEY GARDENS.

The Tibetan form of Paeonia lutea

An exceptional fine new garden plant has been introduced from Tibet by Messrs. LUDLOW and SHERRIFF, in the Tibetan form of *Paeonia lutea* (Fig. 157). It is a far more beautiful plant than the Chinese form of *P. lutea*, originally discovered by Père DELAVAY in 1883. The Chinese form makes bushes about 3 feet high and the flowers are small and usually somewhat hidden by the foliage. It is not a very satisfactory or showy plant for the garden although it has been most useful as a parent for hybridizing, producing as the pollen parent such grand tree Paeonies as *P.* × 'Espérance' and *P.* × 'Argosy.' The Tibetan form has a different habit; it grows more upright to some 6 feet high or more and the flowers stand up above the foliage; the flowers are usually about twice the size of those of the Chinese form and the colour is a real butter yellow. It is a striking plant and seems easy to grow. In this garden the young plants were planted on the side of the cliff in poor chalky soil. They have grown with great vigour and look quite happy in this rather poor place.

In comparing the Tibetan form with the Chinese form there seems to be no doubt that it is *P. lutea* but an exceptional fine form of it. The Tibetan form flowers about three weeks earlier than the Chinese form, the flowers and carpels are larger and perhaps the seed. The foliage is stronger though the leaves are only slightly bigger, but the leaves are more coriaceous than the Chinese form whose leaves are

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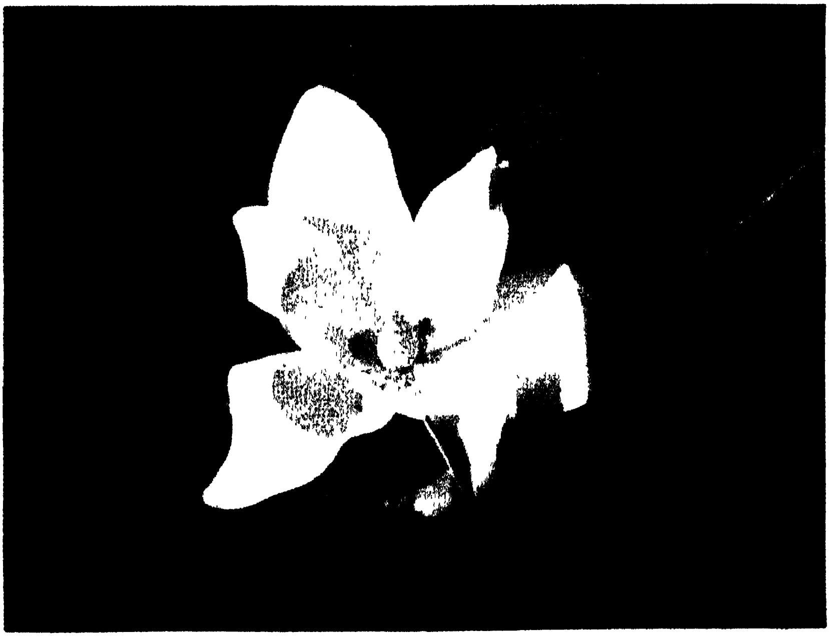
* For the geographical information on Yaku Shima I am indebted to Mr. W. T. STEARN.

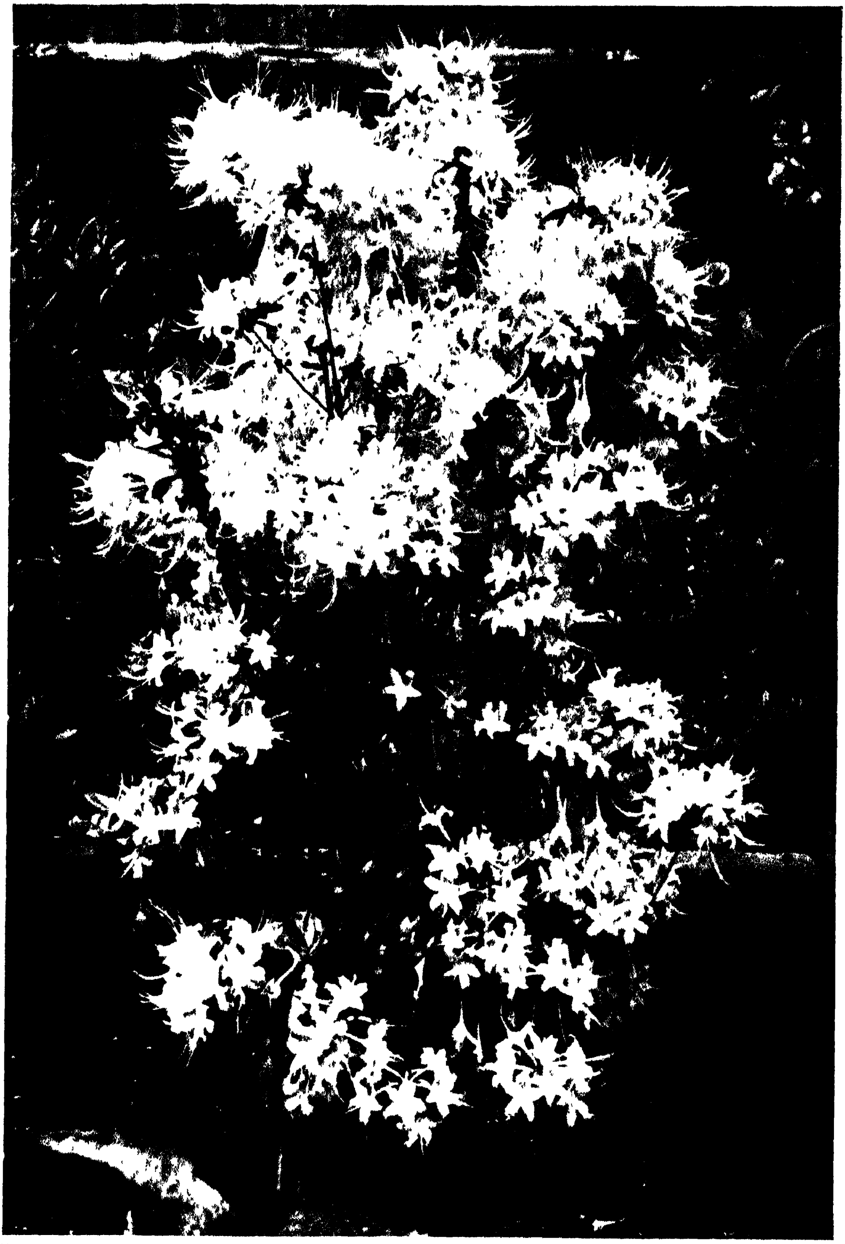
FIG. 145—*Lilium superbum* 'Norman Henry' (See p. 390)



Colour Photos, Josephine Henry]

UNCOMMON AMERICAN SHRUBS AND PLANTS

FIG. 146—*Magnolia Ashei* (See p. 387)



Photos, Josephine Henry

FIG. 147—*Rhododendron alabamense.* Yellow flowered variety in trial garden (See p. 388)

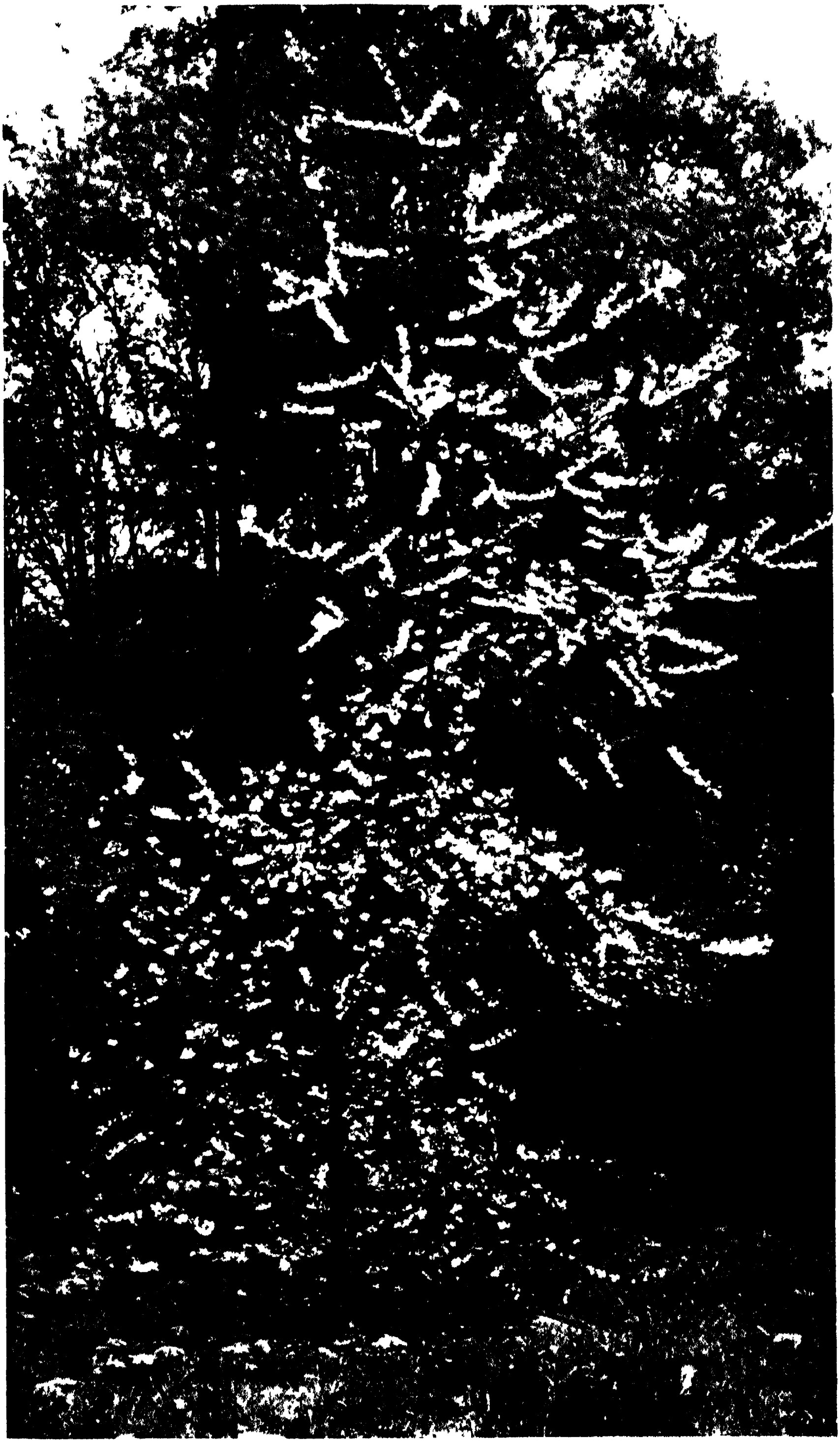


FIG. 148—*Halesia monticola.* Young tree (See p. 385)

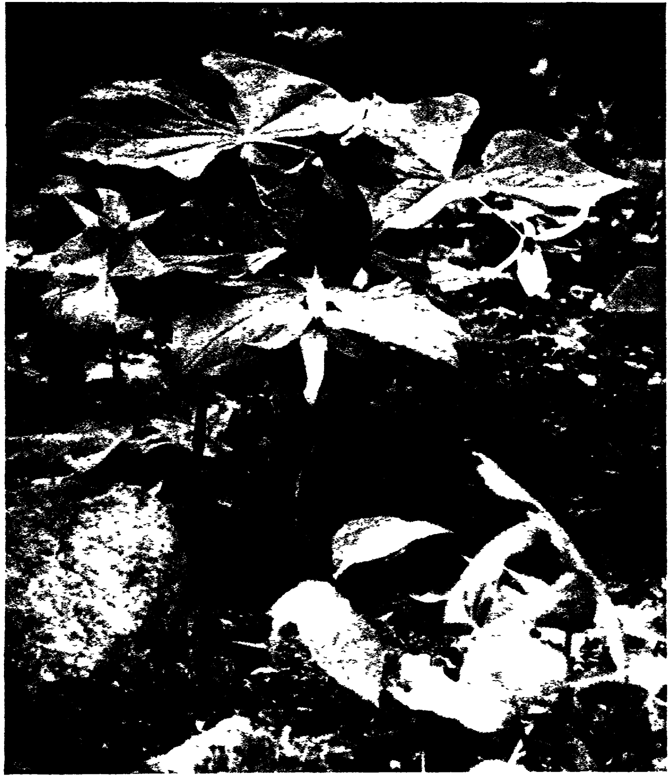


FIG. 149—*Trillium erectum* in red, pink and yellow (See p. 385)

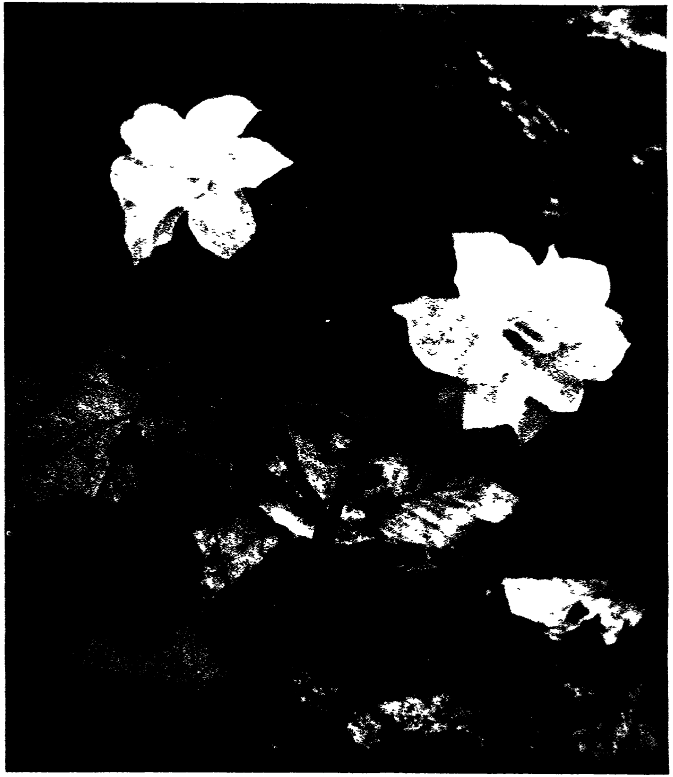


FIG. 150—*Trillium grandiflorum fl. pl.* (See p. 385)

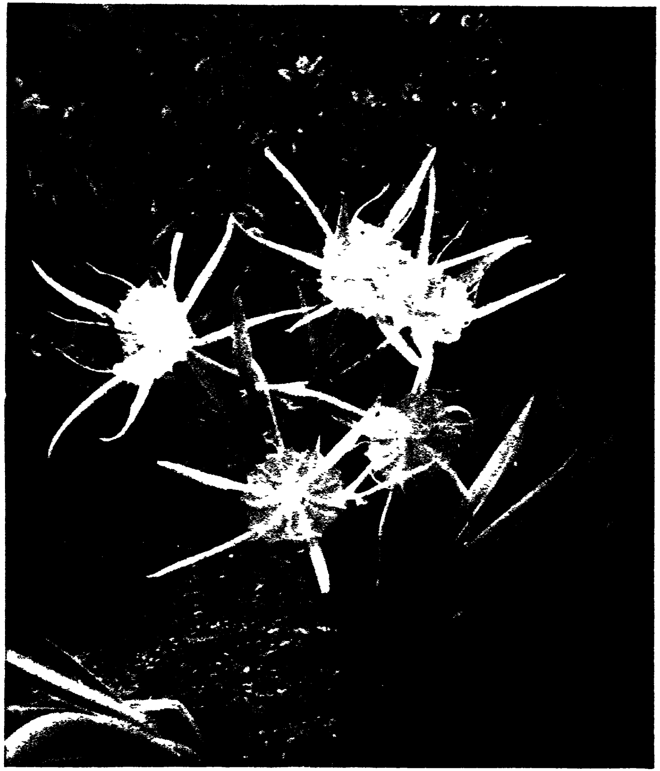


Fig. 151—*Hymenocallis sp.* (See p. 390)

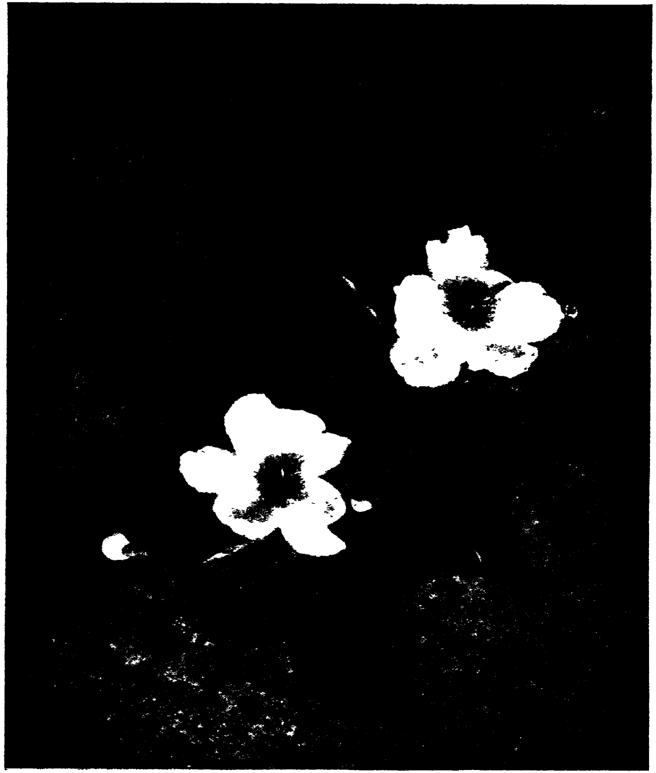


Fig. 152—*Stewartia ovata* (See p. 388)

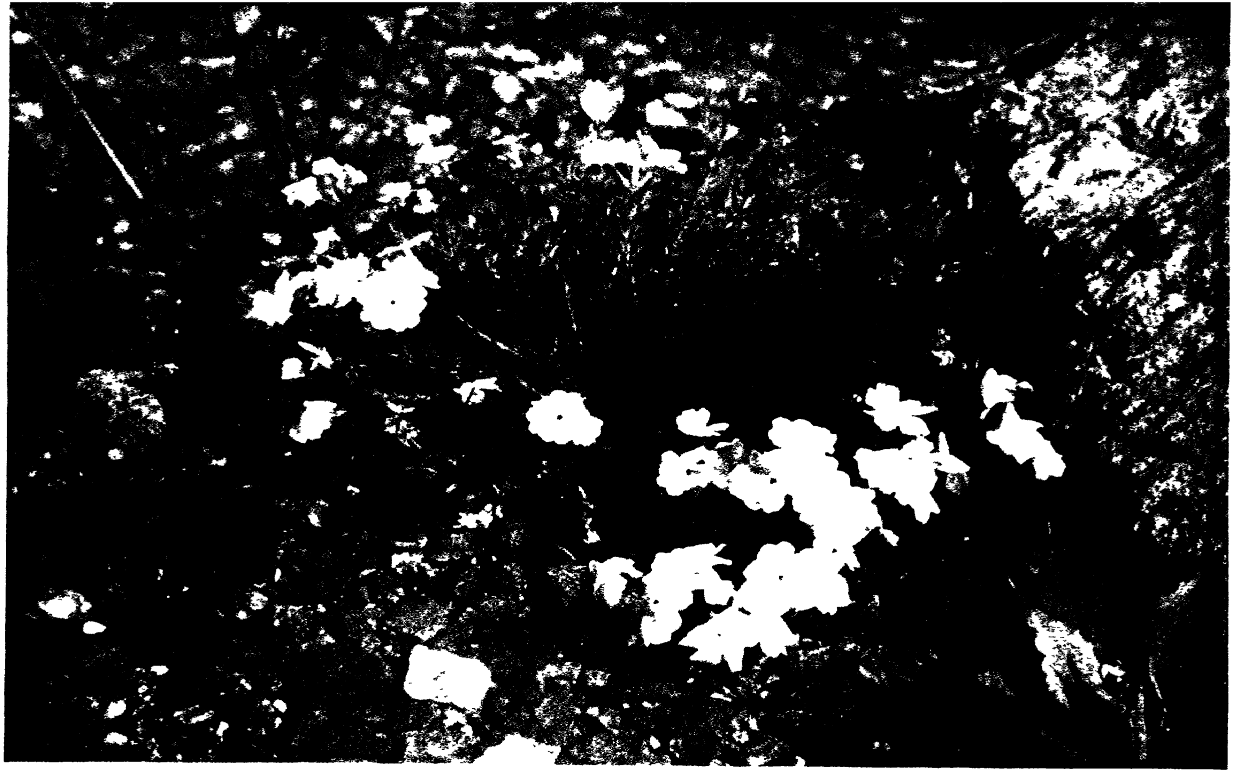


FIG 153—*Phlox nivalis* Picture taken in November (See p 386)

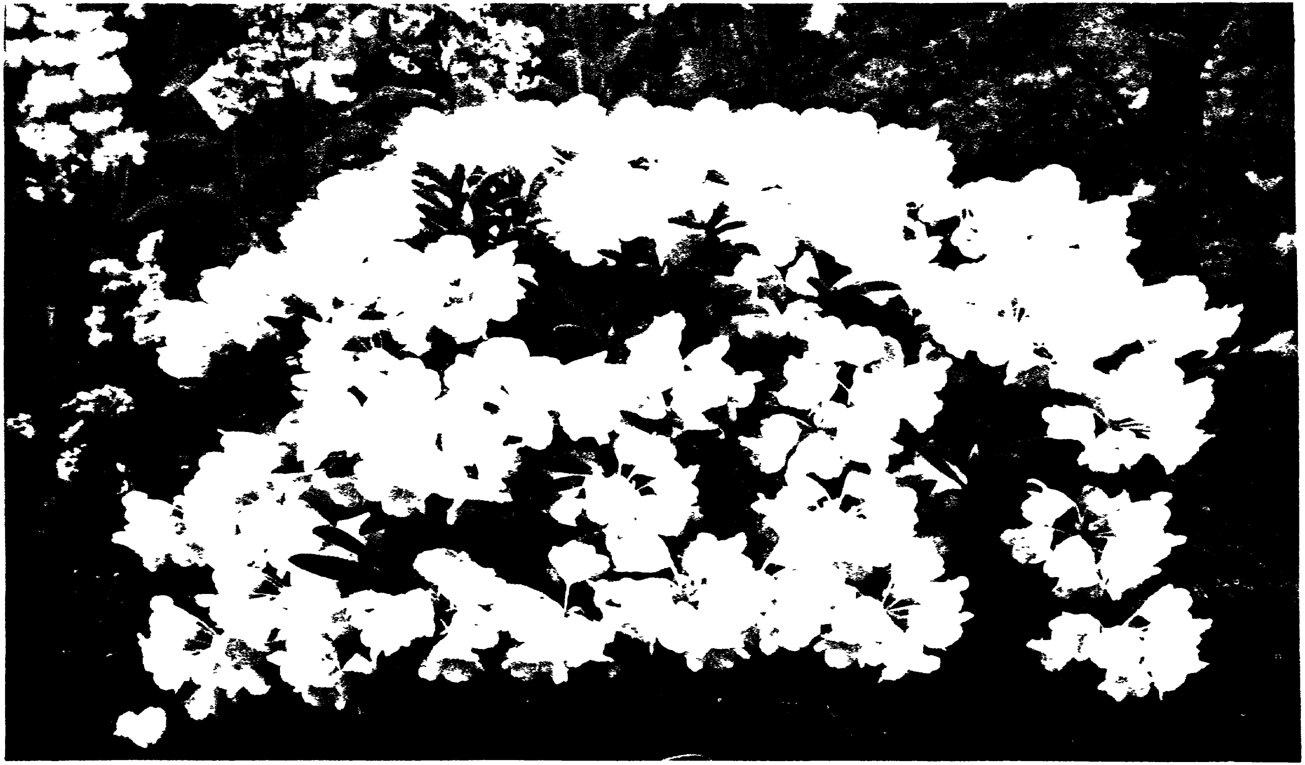
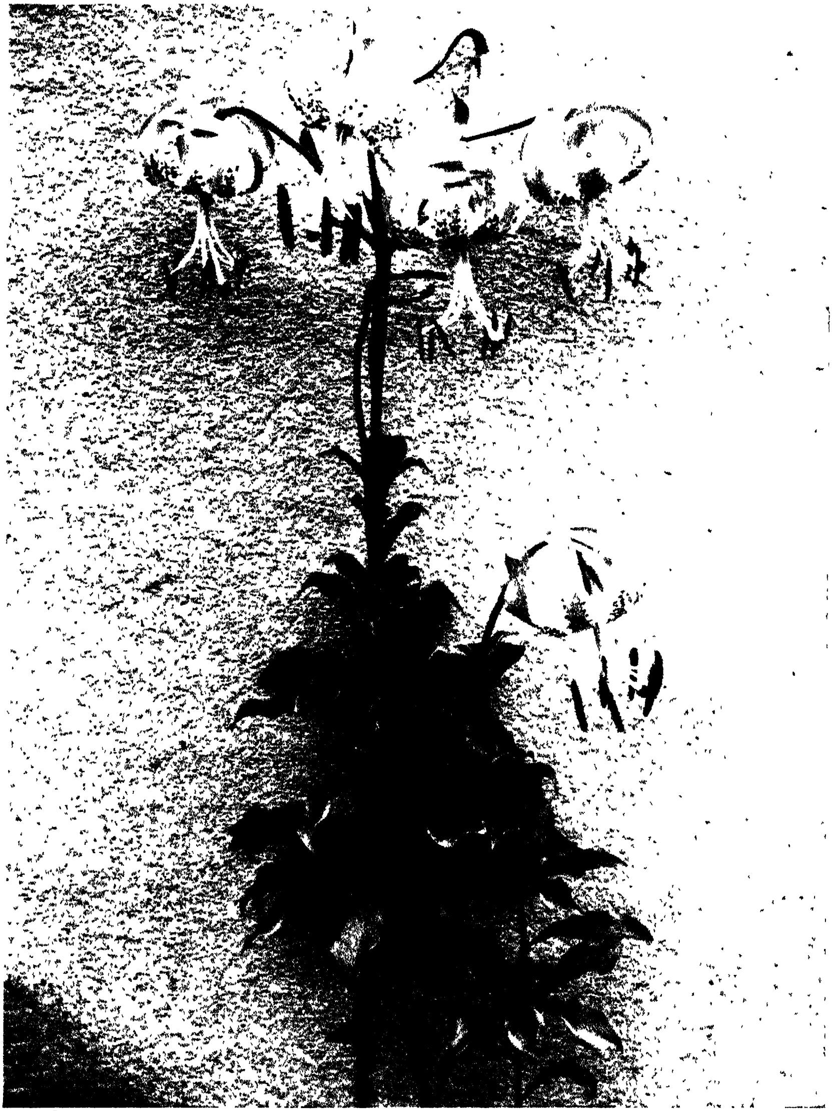


Photo R A Malby,

NEW AND NOTEWORTHY PLANTS

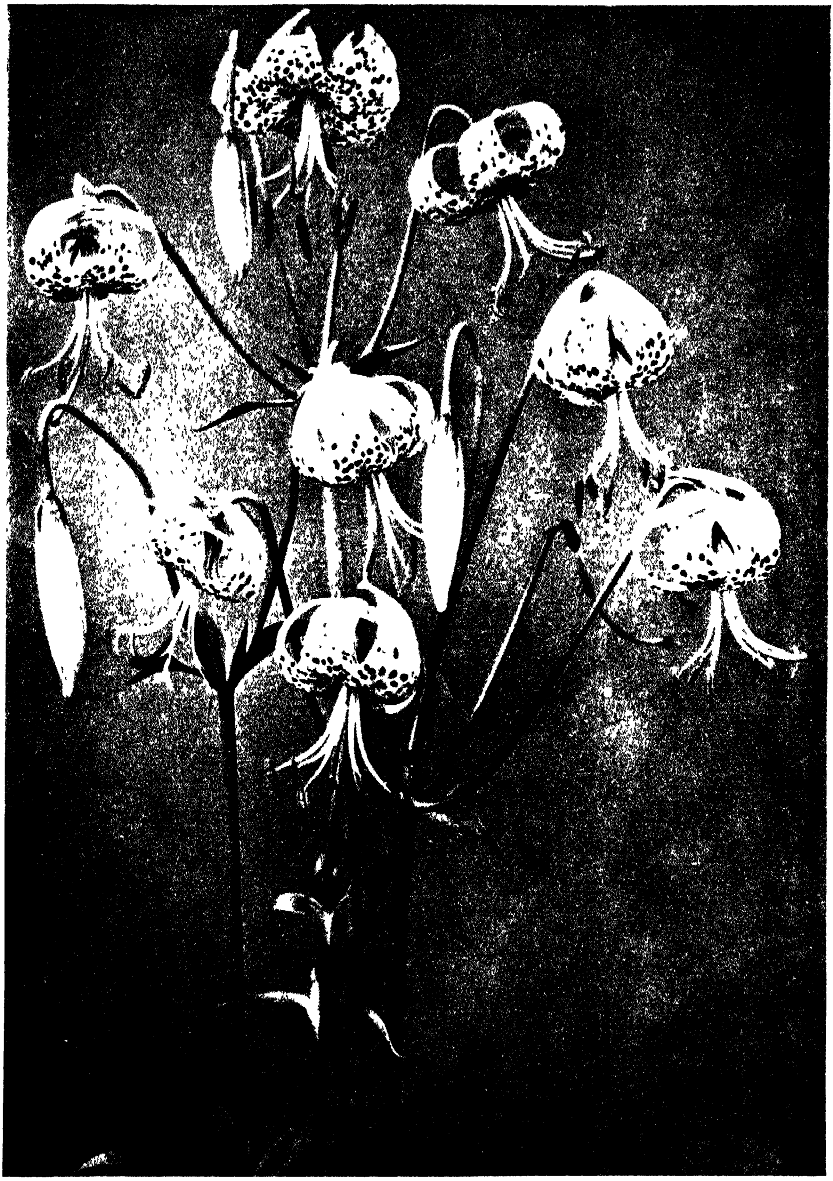
FIG 154—*Rhododendron yakusimanum* **F.C.C.** Plant exhibited at Chelsea (See p 391)



Photo, Josephine Henry

UNCOMMON AMERICAN SHRUBS AND PLANTS

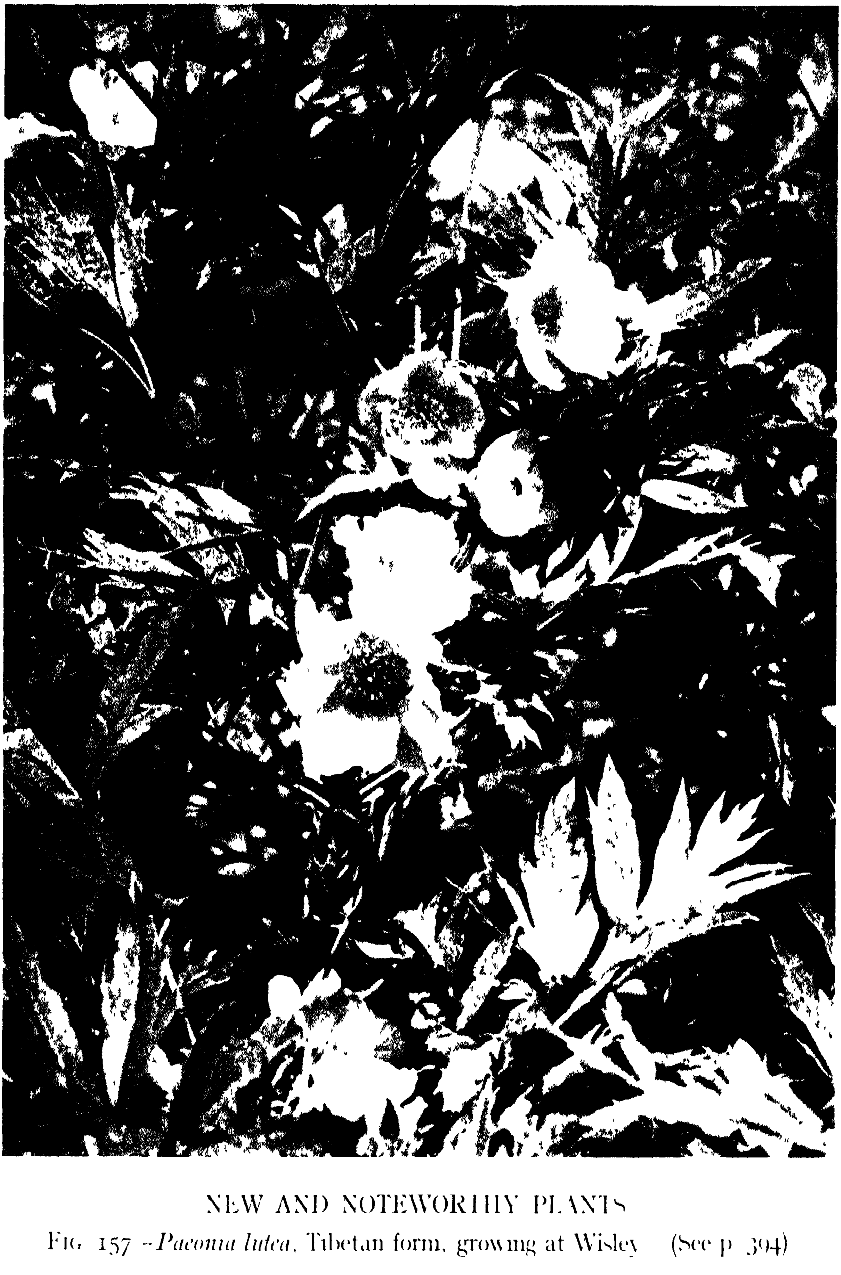
FIG. 155—*Lilium Michauxii* (See p. 391)



Photo, R. A. Malby]

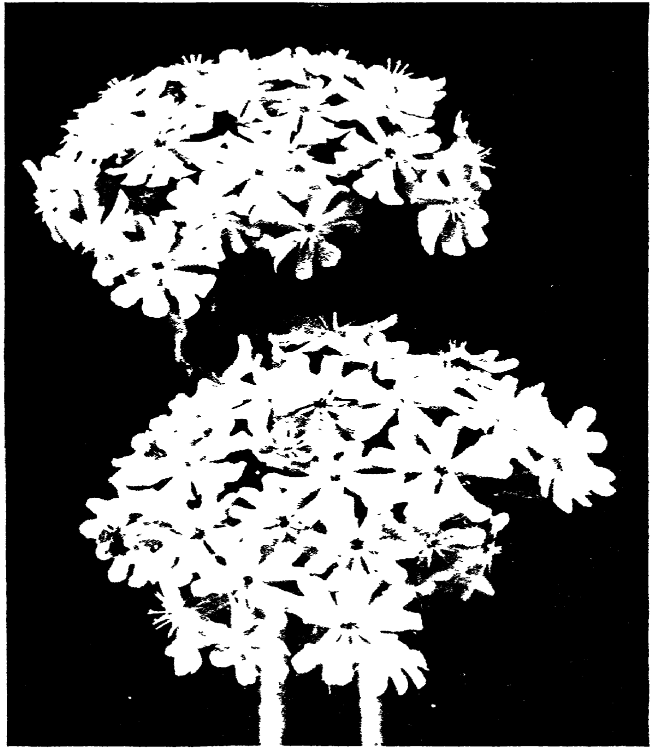
AWARD OF GARDEN MERIT

FIG. 156—*Lilium pardalinum* (See p. 399)

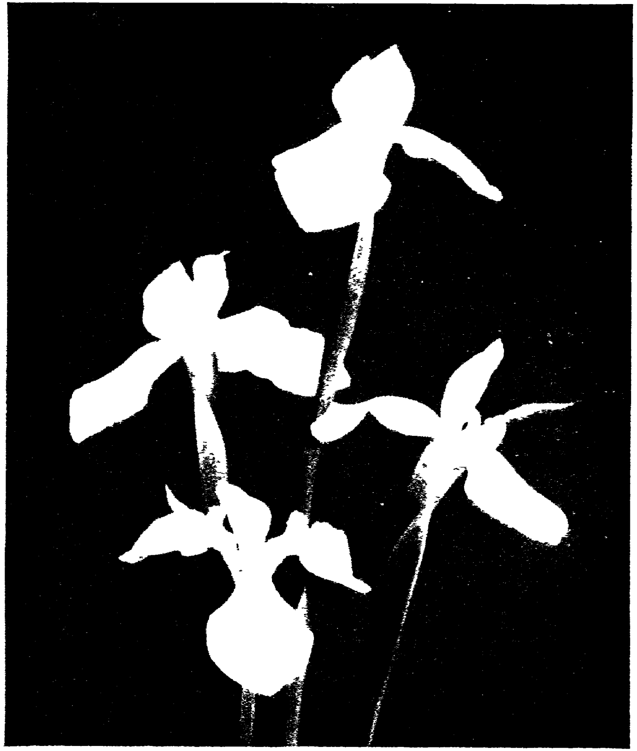


NEW AND NOTEWORTHY PLANTS

FIG. 157 — *Paeonia lutea*, Tibetan form, growing at Wisley (See p 394)



Photos R. A. Malby



AWARD OF GARDEN MERIT

FIG. 158—*Lychnis chalcedonica* (See p. 400)

FIG. 159—*Moraea spathacea* (See p. 400)

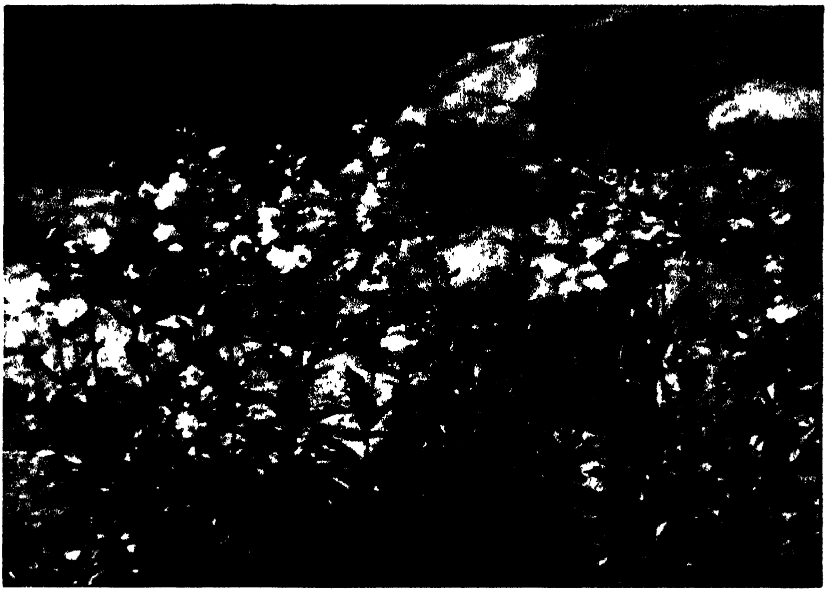
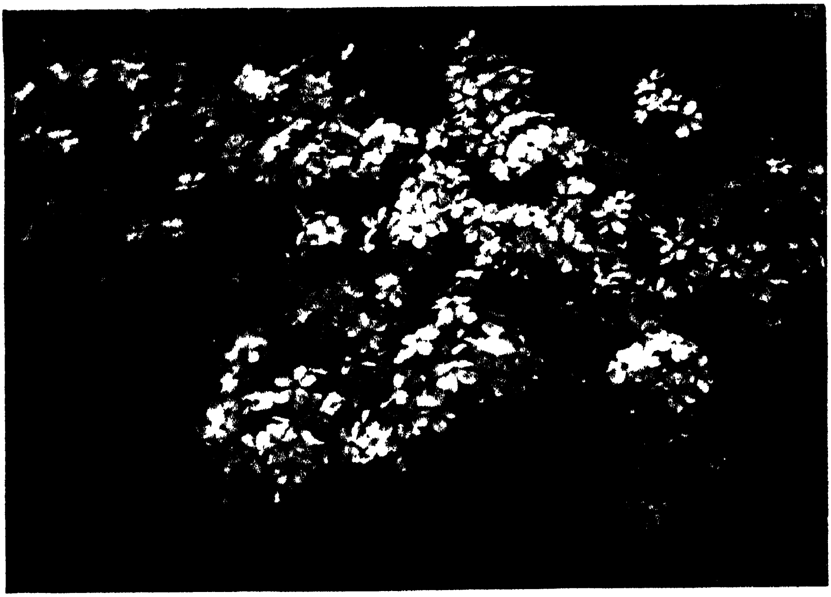


FIG. 160—*Penstemon cobea* × *P. triflorus* 1916 (See p. 380)



UNCOMMON AMERICAN SHRUBS AND PLANTS

FIG. 161—*Phlox divaricata* var. 'Chattahoochee' (See p. 386)

usually smooth and thin. The main characters of *P. lutea* wherein it differs from *P. Delavayi* are in the bracts and sepals. These are exactly the same in both the Tibetan and Chinese forms though both bracts and sepals are somewhat larger in the Tibetan form. It differs from *P. Delavayi* by the absence of the involucre below the calyx so characteristic of *P. Delavayi.*

KINGDON WARD found this Tibetan form at Tsela Dzong on the Tsangpo River in Tibet in 1924; his dried specimen is at the Kew Herbarium under his number K.W. 5691 recorded as growing 6–8 feet high. It was again found by LUDLOW and SHERRIFF in Lung Chayul in southern Tibet at 9,500 feet; specimens of these are in the British Museum Herbarium. Dr. GEORGE TAYLOR of the British Museum (Natural History) has kindly sent me a copy of LUDLOW and SHERRIFF'S field notes which read as follows:

"LUDLOW and SHERRIFF 1376. Lung, Chayul Chu, S.E. Tibet. 28.4.36. Alt. 9,500 feet. Bright orange yellow, anthers ditto. Grows with a straight single woody stem but has 2, 3, 4 or 5 flowers. In scrub jungle and holly oak forest."

Dr. Taylor also collected this form under the numbers LUDLOW, SHERRIFF and TAYLOR 4540 and 6392 and his field notes read:

"L., S. and T. 4540. Tsangpo Valley near Miling. 9,800 feet. 28.5.38. Shrub up to 8 feet with long bare unbranched (or rarely branched) stems bearing leaves and up to 4 flowers at apex Petals golden yellow. Filaments greenish yellow; anthers buff. Carpels green. On dry sandy alluvium or river terraces." "L., S. and T. 6392. Charme, Char Chu. 10,900 feet. 22.10.38. Shrub of 5 feet on river gravel. In fruit. Seed collected."

He further adds:

"In this station it was one of the most magnificent floral spectacles I have seen. With the sun shining through the silky petals it was really a marvellous sight."

LUDLOW and SHERRIFF introduced seed, and from this seed the magnificent plants now flowering in English gardens have been raised. The flowers were shown in several stands of the competition for flowering shrubs at the Chelsea Show in May last.

F. C. STERN.

SOME EXPERIMENTS WITH HORTOMONE A

By S. C. Bradford, D.Sc.

WHEN this, now well known, growth promoting substance was put on the market by the Plant Protection Co. as a synthetic analogue of the natural growth hormone auxine, it was obvious that Hortomone A might be expected to possess other growth inducing properties, as well as that of stimulating the production of new roots from cuttings. It seemed worth while to test this idea. Accordingly, three series of experiments were undertaken: (1) to ascertain whether watering plants with Hortomone A solution would stimulate their growth, (2) to try if soaking the roots of transplanted plants in the hortomone solution would promote the establishment of the plants, and (3) to test its action on the process of budding. As Roses are my special hobby, naturally the experiments were made with these. On account of garden limitations and the high price of the hortomone material, the scale of the experiments was necessarily small. Nevertheless, the consistent results obtained, during the nine years from 1938 to 1946, warrant their description.

1. *Experiments on Watering*

Throughout all the tests, the Roses were long pruned and cultivated as described in my small book *Romance of Roses* (Muller, 1946). As my garden soil is very poor, it may be inferred that the results might have been more striking still on a good rose soil.

Two vigorous plants of each variety were selected, one for treatment and one as a control, the latter being always the slightly larger plant.

In the first experiment the varieties selected were ' Mabel Morse,' ' Mrs. Sam McGredy ' and ' William Moore ' ; the two former Roses had already flowered once that season and had buds of the second crop just forming, while ' William Moore ' had buds in all stages of development for the first crop. On June 17, 1938, the test plants were given one pint each around their roots of a solution of Hortomone A in the proportion of one fluid ounce to one gallon of water.

By July 12, ' William Moore ' had come out splendidly. All the blooms on the treated plant had been appreciably larger and of richer colour than those on the control. And while many flowers on the control had been badly crinkled and bleached by the prevailing cold winds, every flower on the treated bush had come perfect in shape and colour, as if it had been grown under glass. At this time the other two Roses had not yet flowered again.

The doses were repeated on July 12 and again on August 9. The resulting blooms on all the treated plants were now distinctly larger and of richer colour than on the controls. All three treated plants grew stronger shoots and more of them. And by the end of the year each treated plant was now larger than the corresponding control specimen. The time of flowering was the same, or one day earlier, for treated plants as compared with the controls. The expectations had been realized.

Next year in 1939, the same three Roses and, in addition, ' Katherine Pechtold,' ' Mrs. A. R. Barraclough,' ' Southport ' and ' Crimson Glory ' were chosen for experiment. These were treated with one pint each of a weaker solution of hortomone, *i.e.* two-thirds of a fluid ounce to the gallon of water. The doses were given on April 22 and May 26. Except on ' Crimson Glory ' this weaker dose did not have much noticeable effect.

In the following year, 1940, the experiments were continued with the original strength of solution and ' Rouge Mallerin,' ' Portadown

Sally,' 'McGredy's Triumph,' 'Mrs. Chas. Lamplough' and 'Dame Edith Helen' were added to the list of varieties tested. In every case throughout the experiments control plants were used just slightly larger than the tested ones. Doses were given on May 19, June 21 and July 21. The results were exactly similar to those in the first experiment. All the tested plants grew more vigorously than the controls, throwing more and stronger new shoots, both from the branches and from the base, with larger and more deeply coloured blooms, and coming into flower a day or so before. The number of blooms on both the tested plants and the controls was approximately the same, varying according to variety from about twelve to fifty or more per plant. 'Mrs. Sam McGredy' produced many roses 5½ inches across, while those on the control were only about 4 inches in diameter. 'Portadown Sally,' which normally gives only medium size thin flowers, had some splendid 4-inch roses of perfect shape and of good substance. All the flower measurements refer to blooms while still retaining their points.

In May, 1941, the treatment was extended to 'President Chas. Hain,' 'McGredy's Yellow,' 'McGredy's Gem,' 'Phyllis Gold' and one new plant of 'Dr. F. G. Chandler.' Only one dose was given this year as we had to leave home until September. On returning, 'Dr. F. G. Chandler' was in full bloom, making a great show.

In the following year, the tests were continued, with exactly similar results; there was no doubt at all about the increase in size of flowers and in the vigour of the plants. 'Portadown Sally' now gave consistently larger flowers of perfect shape, which held their centres well. 'Katherine Pechtold,' previously rather a bad grower, now threw strong shoots, with particularly gorgeous blooms. But the red colour now seemed getting more pronounced. 'Lady Sylvia' gave some good blooms up to nearly 5 inches across, among very many 4 or 4½-inch roses. 'William Moore' had one bloom among others 8½ inches in diameter. 'Barbara Richards' one 6 inches, 'Mrs. Sam McGredy' several of this same size, 'McGredy's Gem' blooms up to 5 inches and 'Mrs. Barraclough' one 8 inches among others.

The treatment had, by now, become an established practice and was continued every year, on about a dozen plants of different kinds, about four times each year, with always the expected consequences.

In 1946 the Plant Protection Co. became interested in the experiments and most kindly gave me a large bottle of Hortomone A for trial. It was decided to try watering with a larger quantity of a rather weaker solution. Twenty different varieties were selected, including 'Mrs. Sam McGredy' (a different plant), 'Katherine Pechtold,' 'William Moore,' 'Crimson Glory,' 'James Gibson,' 'McGredy's Yellow,' 'G. Duisberg,' 'Phyllis Gold,' 'McGredy's Sunset,' 'Marion Cran,' 'Mrs. G. A. Van Rossem,' 'The Doctor,' 'Dr. F. G. Chandler,' 'Dame Edith Helen,' and some new Roses of my own production. The strength of Hortomone A solution used was three-quarters of a fluid ounce to two gallons of tap water. Half a gallon of solution was given to each plant on July 21, August 26, September 15 and October 6.

All the Roses grew distinctly more strongly than with the one pint treatment, except the plant of 'Mrs. Sam McGredy,' which was an old specimen, that had commenced to throw suckers instead of new shoots from the base, and only increased this undesirable propensity, as well as a plant of 'William Moore' which had evidently been hurt by too rapid thawing in the sunshine of frozen shoots in springtime. The blooms came pale and slightly impaired in shape, until the plant seemed completely recovered in the autumn. Some of the more outstanding results were: 'Dr. F. G. Chandler' grew extraordinarily freely, producing thirteen buds and flowers on the plant at one time, all upstanding on rigid flower stalks and several of the blooms reaching 5½ inches in diameter and holding their centres on the plant for at least a week. (This variety has usually very thin blooms, which open out the same day. But they come much better with long pruning.) 'McGredy's Ivory' in an exposed N.W. position, which had always had its flowers hurt by cold winds, came perfect for the first time in its life; 'James Gibson' grew very strongly, branching all over the plant, and throwing large gorgeous blooms; 'Mrs. G. A. Van Rossem' threw thick shoots with larger, more richly coloured flowers, some not divided, and up to 4½ inches across, while 'Phyllis Gold' gave many flowers in its usual profusion and of its perfect form, but of richer colour and up to 6 inches in diameter.

2. *Experiments with Transplanted Roses*

Six plants, two of each, of three varieties, 'Sir Henry Seagrave,' 'J. C. Thornton' and 'Southport,' received from the nursery with their leaves in mid-October 1938, were chosen for treatment. The roots of one plant each of 'Sir Henry Seagrave' and 'J. C. Thornton' were immersed in water over night. The roots of the remaining four plants were immersed for the same time in a solution of Hortomone A, of the strength of half a fluid ounce to a gallon of tap water. All plants were planted out the next morning.

In the following spring, the treated plants behaved almost exactly as if they had not been transplanted; starting to shoot at the same time as established Roses and producing practically as large and perfect flowers. The control plants grew very much less strongly, starting to shoot later in the spring and producing much smaller blooms.

In subsequent years, the two controls never picked up the start given to the treated Roses, remaining very much smaller in size and giving smaller flowers. The effect of the treatment was most striking. In after years all new Roses have been given this hortomone treatment before planting and always with the same result, except in two cases. One was when a small parcel of Roses was received as a Christmas present and planted out in January, when the ground was too cold for the roots to grow. These Roses behaved as if they had not been treated. The other exception was a parcel of Roses from a well known firm, with whom I had not dealt before. The Roses were received late in November, instructions to send them in October with their leaves having been ignored, and the plants did not seem in good condition when received. All the Roses died during the winter, and next year an outbreak of black spot occurred around where these Roses had been planted. This was my first and, I hope, my only experience of black spot. With these two exceptions, all new Roses have behaved as above described. There have been no losses and no appreciable die-back in winter, during the nine years of the experiments.

The experiments on budding appear to show that Hortomone A has a beneficial effect in the proper dilution. But, although they have been carried on for the last nine years, details require confirmation before giving a full report.

In all experiments with Hortomone A it is important to use exactly the optimum dilution. The first trials will almost certainly show an inhibiting effect. This is really an indication that the hortomone has a definite effect on the growth and that, in the proper strength it will accelerate it. A wide range of concentrations must be tried at first. Usually these will give no more than an indication of the strength which is least harmful and whether this strength lies within or outside the range of the concentrations used. Attention is then directed to consideration of the dilution indicated. The optimum dilution may lie within a range of 0·02 c.c. per half pint of water.

AWARD OF GARDEN MERIT LXXX

335. LILIUM PARDALINUM

Award of Garden Merit, August 11, 1947

This Lily is one of the hardiest and most easily grown of the North American species and has long been known in English gardens under the name of 'Leopard' or 'Panther' Lily. It received a **F.C.C.** in 1872. It is a most variable species and extends through a wide range of country from Southern Oregon to Southern California.

The flowers are recurved, scentless except in one variety, and bright orange in colour, shading to orange-red or crimson towards the tips of the segments. The whole flower is heavily spotted with deep crimson markings, from which it derives its name. A vigorous specimen may grow up to seven feet in height and bear up to thirty flowers. It flowers in July.

This Lily grows best in soil which is slightly moist though not water-logged, and seems to thrive best when planted in full sun. It is tolerant of lime. Under suitable conditions it increases very rapidly, and Judge WOODCOCK and Mr. COUTTS in their book on Lilies record that in their native habitat the bulbs are produced in such quantities that the Chinese in California eat them. This Lily can be grown satisfactorily from seed or propagated from scales. The seed is best sown in the autumn when fresh, otherwise it is liable to lie for a year before germination (Fig. 156).

336. LYCHNIS CHALCEDONICA

Award of Garden Merit, October 21, 1946

This Lychnis with its brilliant scarlet flower heads is one of the most satisfactory subjects for a herbaceous border. It is, however, so strong in colour that it needs to be separated from other more delicate flowering subjects and should be placed with care. It is the first member of this free flowering genus to receive the Award of Garden Merit.

The flowers are borne in dense corymbose clusters on stems three feet high during July and August. It is best grown in full sun and seems to thrive in any garden soil, especially if this be enriched with well rotted manure. There are both single and double forms and also pink and white forms, but the single scarlet is both the commonest and the best. It is easily raised from seed or from divisions (Fig. 158).

337. MORAEA SPATHACEA

Award of Garden Merit, October 21, 1946

This member of the Iridaceae is a native of the Cape Province and is one of the few members of this genus which can be considered reasonably hardy in English gardens. The flowers are large, bright yellow in colour and the outer segments are marked near the top with a series of purple lines shaped rather like a claw. The stems are two to three feet in length and bear three or sometimes more flowers to each stem. The leaves are ensiform and after flowering may reach a height of four feet. It may be propagated from small corms, and when once established, preferably in a warm border under a wall or at the foot of a greenhouse, will quickly form a large clump. In the open it flowers in April and May, but under glass flowers may be obtained in March (Fig. 159).

NOTES FROM FELLOWS

Veronica Derwentia, The Derwent Speedwell

I AM not quite sure whether the Editor will pass this plant under the heading "new" or "noteworthy." Certainly it cannot claim to be a new plant since it was known and cultivated in this country 140 years ago. Is it then noteworthy ? I claim that it is, and further, that it is both interesting and decorative, indeed I find it difficult to explain why it is so rarely seen outside botanic gardens. From a purely horticultural point of view, it is of interest in that it is the only Australian plant which has survived recent winters in the open in this part of the country, and also that it was amongst the first Australian plants to reach us. It is an almost glabrous perennial growing some 2 or 3 feet high, with sessile lanceolate serrate leaves some 2 to 4 inches in length and tapering to a long point. The flowers are white (or slightly tinted), relatively large and borne in racemes some 4 to 8 inches long in the upper axils of the leaves. It is found in many parts of Australia and also is a common plant in Tasmania.

The earliest reference is in *Andrews' Repository*, Vol. 8, and Plate No. 531 is quite a good figure. The text runs: " This new species of Veronica was communicated to us by A. B. Lambert, Esq. It is a native of Botany Bay, on the banks of the Derwent, and was sent over by one of the settlers. The abundance and agreeable fragrance of its flowers render it deserving a place in any collection." The date of this figure is uncertain but other plates in the same volume bear the dates 1806 and 1807. In 1814 the plant was again described in *Botanical Magazine*, t. 1660, by R. BROWN under the name *V. labiata*, though he does not say why he rejected the earlier name. The name ' Derwentia,' by the way, he ascribes to LITTLEJOHN and not to ANDREWS. This plate shows a pale blue flowered plant, is a poor drawing and altogether seems extremely doubtful. A later *Botanical Magazine* plate, t. 3461, also as *V. labiata*, is much more like the plant; this was flowered in 1836, in Glasgow Botanic Gardens. The only reference I can find in more recent times is JOURNAL R.H.S., Vol. 38, where IRWIN R. LYNCH gives it an excellent tabloid description as " herbaceous in habit and almost European in appearance." Mr. PRESTON tells me that they still have the plant at Cambridge. My seed was received some years ago from Mrs. COLEMAN of Blackburn, Victoria, Australia, and was collected at Mt. Buffalo by Mr. HUGH STEWART of Ascot Vale, West Queensland.

The quotation from *Andrews' Repository* is somewhat misleading. The River Derwent from which it is named is probably the Tasmanian River of that name, but the plant may also have been collected in the neighbourhood of Botany Bay, as it is found in New South Wales. It is also recorded from Victoria and the wetter parts of South Australia.

G. W. ROBINSON.

Geranium Wallichianum Buxton's Variety

Among the many good plants occurring in an old garden at Bettws y Coed, BUXTON's form of *Geranium Wallichianum* seems destined to endure longer than any other. This not only because it is a very beautiful plant, but because it flowers late when most things are over, and one which is just difficult enough to grant the grower who does it well a glow of satisfaction. But even though this Cranesbill may be unreliable under some conditions, in most gardens demanding cool, shady conditions, with a free, even stony soil, it has been reported as doing happily in mediums very different. The original plant I remember seeing in a bed mostly composed of slaty rock on the north side of a damp wall, and considerably overhung by Laurel branches, and one wonders, in view of the prevalence of blue forms of *Anemone nemorosa* in slate districts, whether there is anything in that geological formation especially conducive to the production of that colour. However that may be, the 1½-inch bowl-shaped flowers of BUXTON's Geranium are such a lovely nemophila blue, accentuated by the bold white eye, that those of the average *G. Wallichianum* seem a muddy lilac by comparison. But, even so, and though this charming variety will come tolerably true from seed, that the flower colour may vary from year to year, presumably owing to some seasonal influence, is manifest. This, of course, implies that seedlings showing a poor colour should not be discarded, for later on they may turn out to be up to standard. Our best plants, from the original stock, are sometimes disappointing throughout the season. Or they may be tinted with mauve when first opening, say, in August, to attain their clear sky-blue a couple of months later. Being a semi-prostrate trailer BUXTON'S Geranium is most attractive on a slightly elevated slope. The fresh green, prettily lobed downy leaves often assume an emerald tint with purple cloudings, and the stems a ruddy hue, where there is much exposure.

A. T. JOHNSON.

PLANTS TO WHICH AWARDS HAVE BEEN MADE IN 1947

Adenocarpus decorticans. A.M. May 20, 1947. A spreading shrub suitable for gardens in the western counties. The branches are densely covered with deep green, ternate leaves with linear lobes about an inch long. The golden-yellow flowers are produced near the ends of the branchlets in crowded, erect racemes of about twenty. Exhibited by N. G. Hadden, Esq., West Porlock. (See p. lxiv.)

Aquilegia akitensis var. kurilensis. A.M. April 29, 1947. A dwarf-growing species from Japan, one of the few Aquilegias that seems to breed true from seed even when growing side by side with other species. The leaves are composed of three leaflets, each of which is almost again divided into three by the deep lobes. The plants shown were 5 to 6 inches high, with purple and white particoloured flowers, the outer petals were about ⅜ inch long, purple with small white tips; small spurs ⅛ inch long, curving inwards at their tips, project from the back of the flowers, while the inner petals, slightly more than ½ inch long, are purple at the base, changing to cream and white at the tips. Exhibited by Messrs. W. E. Th. Ingwersen, Ltd., Birch Farm Nurseries, Gravetye, Sussex. (See p. lxiii.)

Begonia 'Delice.' F.C.C. May 20, 1947. A tuberous rooted variety of dwarf habit bearing large well-formed double Nasturtium Red (H.C.C. 14/2) flowers 5 inches across, with beautifully waved petals. The colour deepens towards the centre of the flowers to Nasturtium Red (14/1). This variety received an **A.M.** May 21, 1940. Raised and shown by Messrs. Blackmore & Langdon, Bath. (See p. lxiii.)

Begonia 'Jasmine.' A.M. May 20, 1947. A tuberous-rooted variety of erect and very free flowering habit bearing double rich cream flowers measuring 4 inches across. Raised and shown by Messrs. Blackmore & Langdon, Bath. (See p. lxiii.)

Begonia 'Rhapsody.' A.M. May 20, 1947. A very large and well formed tuberous-rooted variety with double salmon-pink flowers measuring 6 inches across. It is free flowering in habit and was raised and shown by Messrs. Blackmore & Langdon, Bath. (See p. lxiii.)

Buddleia Colvilei var. kewensis. A.M. June 17, 1947. *Buddleia Colvilei* is a native of the temperate regions of the Sikkim Himalaya, and was introduced to the British Isles rather more than fifty years ago. In sheltered gardens it succeeds if trained on a high wall, where it sends out long branches clothed with dark green, elliptic-lanceolate, long-pointed leaves and tipped with pendulous panicles a foot or more in length. The individual flower has a broad tube and spreading, four-lobed limb 1¼ inches wide, of variable colour. The plant generally regarded as the type has flowers of Pansy Purple (H.C.C. 928/3); the paler variety *kewensis* matches Fuchsia Purple (H.C.C. 28); while the form figured in the Botanical Magazine (t. 7449) and elsewhere approaches China Rose (H.C.C. 024/1). Exhibited by Lord Aberconway, C.B.E., V.M.H., Bodnant, N. Wales, and Col. F. C. Stern, O.B.E., M.C., V.M.H., Highdown, Goring-by-Sea. (See p. lxx).

Carnation 'A. A. Sanders.' A.M. July 15, 1947. As an exhibition hardy border variety. Flower stems strong, 18 inches long. Flowers double, 3 inches diameter, full petalled, apricot-orange ground, broadly edged and splashed with heliotrope lightly overlaid with scarlet; petals broad, regular and entire; calyx strong. Raised and shown by Mr. F. W. Goodfellow, Valley Nurseries, Aldridge, Staffs.

Carnation 'Eva Humphries.' F.C.C. July 15, 1947. As an exhibition hardy border variety. A picotee variety. Described JOURNAL, **72,** 40. (**A.M.** 1946.)

Carnation 'Frances Sellars.' A.M. July 1, 1947. Exhibition border variety. Flower stems stout, stiff; flowers double, of perfect form and texture, 3 inches diameter, full centred, deep rich rosy-cerise self; margins of petals entire. Shown by Lindabruce Nurseries, Freshbrooke Road, Lancing, Sussex.

Carnation 'Lancing Lady. A.M. July 1, 1947. Exhibition border variety. A white ground fancy with stiff stems and double flowers, 3 inches diameter, of good form, full centred, white pencilled and edged bright scarlet. Shown by Lindabruce Nurseries, Freshbrooke Road, Lancing, Sussex.

Cymbidium 'Swallow,' Exbury var. **F.C.C.** April 29, 1947. A very pleasing result in which the well-formed flowers are yellow slightly tinged with light green, while the front lobe of the labellum has slight reddish spotting. The parents were *C. Pauwelsii* and *C. Alexanderi.* Raised and exhibited by Major Edmund de Rothschild, Exbury House, Southampton. (See p. lxi.)

Delphinium 'Blackmore's Glorious.' A.M. June 24, 1947. Flower spikes, 2½ feet long, pyramidal in form; flowers evenly spaced on the spikes, semi-double, 2¾ to 3 inches diameter, of good form and texture; inner petals Mineral Violet (H.C.C. 635/2), outer petals Cerulean Blue (H.C.C. 46/2); eye blue and mauve. Raised and shown by Messrs. Blackmore & Langdon, Twerton Hill Nursery, Bath. (See p. lxxi.)

Embothrium lanceolatum Ñorquinco Form. A.M. June 3, 1947. A distinct variety raised from seed collected about twenty years ago by Mr. H. F. Comber in the Argentine. It can be considered quite hardy, having withstood 34 degrees of frost unharmed at Bodnant. The tubular, orange-scarlet flowers are closely bunched along the branches, instead of being scattered as in other forms, and contrast effectively with the rich green of the narrow leaves. Exhibited by Lord Aberconway, C.B.E., V.M.H., Bodnant, N. Wales. (See p. lxviii.)

Laeliocattleya 'Jervis Bay' var. 'Our King.' A.M. May 20, 1947. A well-formed flower in which the sepals and petals are rosy mauve, the labellum intense ruby crimson. Produced by crossing *Lc.* 'Crowborough' with *Lc.* 'Windermere.' Exhibited by Lt.-Col. F. E. Griggs, The Spinney, Chislehurst. (See p. lxiv.)

Laeliocattleya 'Talana.' A.M. April 29, 1947. The spike bore 3 large flowers, with whitish sepals and petals, and a purplish labellum. The result of crossing *C.* 'Eleanore' with *Lc. Schroederae.* Raised and exhibited by H. W. B. Schroder, Esq., Dell Park, Englefield Green, Surrey. (See p. lxi.)

Lilium pyrenaicum. A.M. June 3, 1947. The Yellow Turk's-cap Lily has been grown in English gardens for centuries. It is a vigorous and easily-grown plant, and when established in the border or woodland garden regularly produces stiff, erect stems up to 4 feet in height, with very numerous, narrow leaves and heads of up to a dozen rather small flowers on stalks 3 to 4 inches long. The recurved perianth-segments are greenish-yellow with small black spots, and the projecting stamens are tipped with scarlet pollen. Exhibited by G. P. Baker, Esq., V.M.H., Sevenoaks. (See p. lxviii.)

Lilium Scottiae Hybrid. A.M. May 20, 1947. A pretty variety raised by the exhibitors. The plant shown was 2 feet tall, the stem densely clothed with narrow-lanceolate leaves 3 inches long. The erect, chrome-yellow, chocolate-spotted flowers are each 5 inches in diameter and are carried five or six together in a terminal umbel. Exhibited by Messrs. W. A. Constable, Ltd., Southborough, Kent. (See p. lxiv.)

Lonicera tatarica sibirica. A.M. May 20, 1947. A dense shrub up to 10 feet in height with bright green, ovate-lanceolate leaves about 2 inches long. The paired flowers are carried on axillary peduncles about ¾-inch long. The corolla is an inch across and has five spreading deep rose-pink lobes. A very free-flowering and attractive variety of a variable species. Exhibited by Mr. W. J. Marchant, Wimborne. (See p. lxiv.)

Lysichitum camtschatcense. A.M. April 29, 1947. Two species of *Lysichitum* are in cultivation, both being fine, bold plants for the bog garden or waterside, producing in early Spring huge, Arum-like inflorescences rapidly succeeded by tufts of broad green foliage. In one the spathes are yellow, in the other pure white. The yellow one is correctly named *L. americanum,* but unfortunately it was long known in gardens, figured in the *Botanical Magazine* and given the A.M. in 1927 under the name *L. camtschatcense,* which properly belongs to the white one. Exhibited by Lord Aberconway, C.B.E., V.M.H., Bodnant, N. Wales. (See p. lx.)

Narcissus 'Armada.' F.C.C. April 15, 1947. As a variety for exhibition (voting unanimous). This well-formed Incomparabilis variety, raised by Mr. Guy L. Wilson and shown by Messrs. G. Zandbergen-Terwegen, Sassenheim, Holland, received an Award of Merit on March 20, 1945. (See Journal, vol. LXX, p. 214, 1945; vol. LXXII, p. lvii.)

Narcissus 'Bizerta.' A.M. April 29, 1947. A striking, medium-sized, bicolor Incomparabilis variety (Division 2b) with a flower about $4\frac{1}{8}$ inches in diameter, well poised on a stout 17-inch stem. The smooth, white perianth segments were overlapping, the outer ones being about $1\frac{3}{4}$ inch long and $1\frac{11}{16}$ inch broad. The neat, cup-shaped, deep lemon-yellow corona (H.C.C. 4), which made a fine contrast with the perianth, was $1\frac{1}{8}$ inch long and nearly $1\frac{3}{4}$ inch across at its indented and crimped margin. Raised and shown by Mr. J. L. Richardson. (See p. lxii.)

Narcissus 'Crock of Gold.' A.M. April 29, 1947. A well-formed, yellow Trumpet variety (Division 1a) with a flower $4\frac{1}{2}$ inches in diameter, well poised on a very stout 17-inch stem. The aureolin-yellow (H.C.C. 3/1), fairly smooth perianth segments were of medium width, the outer ones being $1\frac{13}{16}$ inch long and $1\frac{5}{8}$ inch broad. The corona, which was a deeper shade of aureolin-yellow, was about as long as the segments and about 2 inches across at its indented and slightly reflexed margin. Raised and shown by Mr. Guy L. Wilson, Broughshane, Co. Antrim. (See p. lxii.)

Narcissus 'Frigid.' A.M. May 20, 1947. A neat, small-crowned Leedsii variety, with a flower $3\frac{1}{4}$ inches in diameter, well poised on a 20-inch stem. The perianth segments were rounded and smooth, the outer ones being $1\frac{3}{8}$ inches in diameter and about as broad. The saucer-shaped corona which was white, with a lettuce-green (H.C.C. 860/3) eye, was rather less than $\frac{1}{4}$ inch long and nearly $\frac{3}{4}$ inch in diameter. Raised by Mr. Guy L. Wilson and shown by Mr. J. L. Richardson, Prospect House, Waterford. (See p. lxv.)

Narcissus 'Goldcourt.' F.C.C. April 29, 1947. This refined, yellow Trumpet variety (Division 1a) received an **A.M.** on April 16, 1946. See Journal, **71,** p. 205. Raised and shown by Mr. J. L. Richardson, Prospect House, Waterford. (See p. lxii.)

Narcissus 'Mahmoud.' A.M. April 29, 1947. A fine bicolor Barrii variety (Division 3b) had a flower $3\frac{1}{2}$ inches in diameter, well poised on an 18-inch stem. The white, smooth rounded perianth segments were $1\frac{1}{2}$ inch long, the outer ones being about as broad. The saucer-shaped, pleated, orange (H.C.C. 12) corona was about $1\frac{1}{8}$ inch across. Raised and shown by Mr. J. L. Richardson. (See p. lxii.)

Narcissus 'Parkmore.' A.M. April 29, 1947. A well-formed, white giant Leedsii variety (Division 4a) with a flower $4\frac{3}{4}$ inches in diameter, well poised on a very stout 15-inch stem. The smooth, overlapping segments were 2 inches long, the outer ones being $1\frac{7}{8}$ inch broad. The neat, sulphur-white corona, which was $1\frac{3}{4}$ inch long and 1⅝ inch broad at the mouth, was cylindrical except for a narrow reflexed and frilled margin. Raised by Mr. Guy L. Wilson and shown by Mr. W. J. Dunlop, Dunrobin, Ballymena, N. Ireland. (See p. lxii.)

Narcissus 'Spitzbergen.' A.M. April 25, 1947. As a variety for exhibition. A bold and attractive pale bicolor Trumpet variety with a flower nearly 4¾ inches in diameter, well poised on a stout 19-inch stem. The sulphur-white undulating segments were broad and overlapping, the outer ones being about $1\frac{15}{16}$ inches long and about 2 inches broad. The pale Primrose-yellow (H.C.C. 601/3) corona was 2 inches long and about 2⅜ inches diameter at its indented and reflexed margin. Raised and shown by Mr. J. L. Richardson. (See p. lix.)

Narcissus 'Statue' A.M. April 25, 1947. As a variety for exhibition. A well-formed bicolor Incomparabilis variety with a flower 4⅞ inches in diameter, well poised on a stout 21-inch stem. The white, smooth segments were of moderate width, the outer ones being nearly 2⅛ inch long and 1⅝ inches broad. The neat, funnel-shaped, Sulphur Yellow (H.C.C. 1/2) corona was just over 1¼ inches long and 1⅜ inches in diameter at its frilled mouth. Raised by Mr. J. L. Richardson and shown by Major C. B. Habershon, Hesterworth, Aston-on-Clun, Craven Arms, Shropshire. (See p. lix.)

Narcissus 'Trousseau.' F.C.C. April 15, 1947. As a variety for exhibition (voting unanimous). This handsome bicolor Trumpet variety (Division 1c), raised by the late P. D. Williams, and shown by Mr. J. L. Richardson, received an Award of Merit on March 20, 1945. (See JOURNAL, vol. LXX, p. 225, 1945 ; vol. LXXII, p. lvii.)

Odontoglossum 'Mary' A.M. April 29, 1947. The spike bore 4 flowers with broadly developed segments, golden-yellow with red-brown blotches. The result of crossing *O. triumphans* with *O.* 'Brimstone Butterfly.' Exhibited by Lt.-Col. F. E. Griggs, The Spinney, Chislehurst, Kent. (See p. lxi.)

Odontonia 'Amphia' var. 'Vanguard.' F.C.C. May 20, 1947. A fine example of this bigeneric hybrid. The arching spike bore eleven large flowers, light rose, heavily marked with crimson-red. The result of crossing *Odontoglossum* 'Clonius' with *Odontonia* 'Duchess of York.' Exhibited by Messrs. Sanders, St. Albans. (See p. lxiv.)

Odontioda 'Dovedale.' A.M. May 20, 1947. The spike bore five well-formed flowers of deep rose colour symmetrically marked with scarlet-rose. The result of crossing *Oda.* 'Dovere' with *Odm.* 'Sheila Stephenson.' Exhibited by McBean's Orchids, Ltd., Cooksbridge. (See p. lxiv.)

Rehderodendron macrocarpum. A.M. May 20, 1947. A Western Chinese deciduous tree allied to Styrax. The flowers are five-petalled, white, about an inch across, with conspicuous yellow anthers, and are borne in axillary ten-flowered racemes. The leaves are ovate-elliptic, finely serrate, with reddish petioles. Exhibited by G. H. Johnstone, Esq., Grampound Road, Cornwall. (See p. lxiv.)

Rhododendron 'Angelo' (Griffithianum ♀ × discolor). F.C.C. June 3, 1947. This splendid hybrid received the **A.M.** in 1935. It forms a tall and shapely truss of about twelve flowers supported on glaucous, purplish pedicels 2½ inches long. The corolla is flattish-funnel-shaped, 3½ inches long and 5½ inches wide, with seven crimped and waved lobes. It is at first pale blush-pink outside, white with some pale green spots within. The stamens are over 2 inches long, with white, glabrous filaments, the ovary and style densely glandular. Leaf oblanceolate, 7 inches long, mat green, very pale beneath. Exhibited by Major E. de Rothschild, Exbury, Southampton. (See p. lxviii.)

Rhododendron 'Blancmange' ('Godesberg' ♀ × auriculatum). A.M. June 3, 1947. A very fine pure white hybrid. The shapely truss is made up of eighteen flowers on green pedicels 1½ inches long. The seven-lobed corolla is funnel-shaped, 3 inches long and 3¾ inches wide, prettily frilled at the margin. The elliptic, mat green leaf is 9 inches long and 4 inches wide. Exhibited by Major E. de Rothschild, Exbury, Southampton. (See p. lxviii.)

Rhododendron × Capt. Blood (*R. Queen Wilhelmina* ♀ × *R. Griersonianum*). **A.M.** April 29, 1947. An early-flowering Griersonianum hybrid, with 9 to 10 flowered trusses of broadly funnel-shaped, Claret-rose (H.C.C. 021) blossoms, 3 inches long and 3 inches wide, with slight spotting on the upper petals. Leaves up to 9 inches long on 1½ inch petioles, narrow elliptic, accuminate, dark green above, paler beneath. Exhibited by Capt. C. Ingram, The Grange, Benenden, Cranbrook, Kent. (See p. lxiii.)

Rhododendron Cremorne var. (to be named). **A.M.** April 29, 1947. (*R. Luscombei* ♀ × *R. campylocarpum*). Flowers in a large rounded truss of about 12 blooms, buds pink, opening to cream-coloured flowers with pink margins, the area of cream increasing as the flowers age. Corolla 2 inches long, 2½ to 3 inches wide, calyx small brownish. Leaves elliptic, mucronate, on 1 inch petioles, leaf blade 3 inches long, 2 inches wide, glabrous and dark green above, paler beneath. Exhibited by the Rt. Hon. Lord Swaythling, Townhill Park, West End, Southampton. (See p. lxiii.)

Rhododendron inaequale. A.M. April 29, 1947. A white-flowered species, with delightfully scented blossoms, grown at the moment in a cold frame or wall case, believed to be doubtfully hardy, but this factor has not been fully tested. Leaves 2½ inches long, dull dark green above, sparingly covered with brown hairs, particularly near the margins. Flowers 4 inches wide and 2 inches long, the upper petal of each bloom marked with a broad orange-yellow band extending more than half its length. Exhibited by Lord Aberconway, C.B.E., V.M.H., Bodnant, N. Wales. (See p. lxiii.)

× Rhododendron 'Jutland' (R. 'Bellerophon, × R. Elliotii). A.M. June 17, 1947. A late flowering crimson hybrid with a large dome-shaped truss which contained 19 flowers in the specimen exhibited, the pedicels are dark red, ¾ inch long, flecked with white glandular hairs, while the brownish-white bracts appear to persist amongst the tightly packed flower-stalks until after the blooms fade. The corolla is 2½ inches long × 2½ inches wide, 5 lobed, open bell-shaped, and in colour Geranium Lake (H.C.C. 20), freely flecked on the upper petals and slightly on the lower with darker red markings. The five petals are constricted at the base to form five deep and well marked nectaries. Leaves up to 6¾ inches long, dull mat green above, paler below, ob-lanceolate, mucronate, with recurved margins. Exhibited by Major E. de Rothschild, Exbury House, Southampton. (See p. lxx.)

Rhododendron 'Kilimanjaro' ('Dusky Maid' ♀ × Elliottii). F.C.C. June 3, 1947. A hybrid of intensely rich colouring, matching the Currant Red of the Horticultural Colour Chart (821/1). The compact, globose truss contains eighteen flowers on glandular pedicels. The corolla is funnel-shaped, 2¾ inches long, 3½ inches wide, with spreading lobes 1¾ inches wide and 1 inch long. The narrow-elliptic leaf is 6 inches long, mat green, paler beneath. Exhibited by Major E. de Rothschild, Exbury, Southampton. (See p. lxviii.)

Rhododendron × Yeoman. A.M. April 29, 1947. A dwarf-growing colourful hybrid from *R. Choremia* ♀ and *R. repens*, with 7 to 11 flowered trusses of Turkey-red blossoms (H.C.C. 721/1), the corolla 1½ inches long, 2 to 2½ inches wide, regular, and bell-shaped calyx petaloid—the upper segment at least twice the length of the others, arches over the base of the corolla tube. The leaves are elliptic 4 inches long, 1½ inches wide, dark green glabrous above, underside pale, margins slightly recurved, apex obtuse mucronate. Exhibited by Lord Aberconway, C.B.E., V.M.H., Bodnant, N. Wales. (See p. lxii.)

Rose 'Charles Gregory.' A.M. June 17, 1947. A fragrant seedling hybrid tea variety raised by Mr. H. A. Verschuren in Holland 1938. It is very lovely in bud and of a very distinct and pleasing deep cherry-red colour with yellow at the base of the petals. Introduced and exhibited by Messrs. C. Gregory & Son, Ltd., Old Close Nurseries Chilwell, Notts. (See p. lxix.)

Rubus trilobus. A.M. May 20, 1947. A most attractive species collected by Mr. E. K. Balls in Mexico, in 1938. It forms a loosely-branched bush 5 feet high with arching stems bearing broad-ovate, three-lobed, serrate leaves 2½ inches long. The flowers, which are borne singly on short, lateral branchlets, are 2½ inches across, quite flat, and have five broad-ovate, fimbriate, pure white petals. The fruit is black, supported by the deep red, persistent calyx. Exhibited by Capt. Collingwood Ingram, Benenden, Kent. (See p. lxiv.)

Sargentodoxa cuneata. Botanical Certificate, May 20, 1947. A deciduous Chinese climbing shrub with large, ternate leaves and long racemes of six-sepalled, greenish-yellow, unisexual flowers. Exhibited by Sir Henry Price, Wakehurst Place, Ardingly. (See p. lxiv.)

Smilacina racemosa. A.M. May 20, 1947. A very handsome herbaceous plant for the moist border or woodland garden. From a stout rhizome it produces arching growths bearing two-ranked, oval leaves and large, terminal panicles of small, white, starry flowers succeeded by red berries. Exhibited by W. Bentley, Esq., Quarry Wood, Newbury. (See p. lxiv.)

Tulip 'Smiling Queen.' A.M. May 20, 1947. A Cottage Tulip (Division 6) with an egg-shaped flower having a white base and yellow pollen. The segments were rose-opal (H.C.C. 022/1) with paler margins. The outer segments was 3½ inches long and 2½ inches broad. Raised by N. Roozen, Heemstede, Holland, and shown by Messrs. Walter Blom & Son, Ltd., Coombelands Nurseries, Leavesden, Watford, Herts. (See p. lxv.)

Tulipa linifolia. A.M. May 20, 1947. This well-known little species, native of Darwas in Eastern Bukhara, has flowers about 2 inches long, borne on 9-inch stems. The flowers open readily in the sun, showing the inner surfaces to be of a shiny intense signal-red (H.C.C. 719) blotched at the base with purple madder (H.C.C. 1028). Shown by Messrs. R. Wallace & Co., The Old Gardens, Tunbridge Wells. (See p. lxv.)

BOOK NOTES

"The Detection and Control of Garden Pests" By G Fox Wilson. 194 pp. and 54 plates bearing 104 illustrations. (Messrs. Crosby Lockwood & Son, Ltd 1947.) 12*s* 6*d*. net.

Mr G. Fox Wilson has gained an enviable reputation among growers, gardeners and students, as well as among advisory entomologists and applied biologists, for his skill in accurately diagnosing garden pest damage and for giving sound advice as to the best control measures to be taken.

After a somewhat tantalising series of articles entitled "Symptoms of Pest Attack on Plants" in the *Gardeners' Chronicle* some years ago, he has now found time to write this book which is packed from cover to cover with his "accumulated knowledge of years of experience of pests in the field and garden, an experience unrivalled among living entomologists," as Professor Stoughton says in the Foreword.

For this the horticultural student, Advisory Horticultural Officers and Inspectors as well as commercial and amateur growers should be profoundly grateful. Here at last is a really authoritative reference book on the detection or recognition of garden pests by the symptoms of plant injury

The book starts with a stimulating introductory chapter which deals with the plant as a factor, the types of pests, the life history of insects, feeding habits, the effect of pests on plants, and a short list of standard English works of special interest to those engaged in the cultivation of crops. Then follow eight chapters entitled -Bulbs, Corms and Tubers, Roots, Stems and Shoots, Buds, Foliage, Flowers, Fruits and lastly Seeds. The procedure adopted in these chapters is on a uniform plan. They each start with a short description of the plant part in question, e.g. Fruits, together with a general account of the effect on the plant of damage to it Then follow side-headings of the various types of damage that may occur Thus in the chapter under consideration they are classified as "Fruits Blistered," "Fruits Distorted," "Fruits Dropping," "Fruits Punctured," "Fruits Scaly," "Fruits Scarred," "Fruits Spotted" and "Fruits Tunnelled." Under these side-headings the pests causing such damage are mentioned and the appropriate control measures are given.

The frontispiece consists of a diagrammatic conception of an Apple tree to illustrate that every portion of a plant is liable to attack. The introduction is illustrated by four plates depicting very clearly the types of plant pests, the types of insect larvæ, the life history of insects and types of insect mouthparts. Then follow 99 excellent photographs by Mr. F. C. Brown of many of the types of damage that have been described.

Finally, the value of the book is enhanced by three indexes—host plant, scientific and general

As a result of the author's conciseness and clarity, both in words and pictures, he has been able to get a vast amount of authentic information into a comparatively small space without making the using of the book too complicated. One slight improvement which might be borne in mind for further editions is the insertion, perhaps at the beginning of the appropriate chapters, of lists of the various types of damage to be described so that the user of the book seeing them all at a glance should be helped in a more rapid placing, and consequent diagnosis, of the trouble concerning which he wants information.

The book can be recommended without hesitation, as an indispensible work of reference, to horticultural students and teachers, Advisory Officers and Inspectors, commercial and amateur growers.

Finally the publishers are to be congratulated on making available such a "high level" contribution to all those interested in the production of more beauty and food.

H. F. B.

"Pomologi. Beskrivningar över de viktigaste i Sverige odlade fruktsorterna." By Carl G. Dahl. Second edition. (Albert Bonniers Förlag, Stockholm, 1943.) Vols. 1 (300 pp.) and 2 (390 pp.). 83 Swedish kronor.

Professor Carl G. Dahl is one of the foremost of present day systematic pomologists. The first edition of his "Pomologi" was published at Stockholm in 1929 and embodied the results of well over twenty years' study and observation of the varieties of fruits grown in Sweden. This and the second edition set out to describe only the most important varieties, not every one known, but they include many of British origin. This second edition is more than a reprint of the first. Considerable additions have been made and the number of varieties increased, so that Apples now occupy 275 pages, instead of 233, and Pears 170 pages instead of 154 pages. The two volumes, written in Swedish, bring together detailed descriptions of Apples, Pears and Plums, and are profusely illustrated. Vol. 1 is devoted entirely to Apples and describes about 138 varieties arranged in order of ripening Under each variety is given (1) an excellent bibliography with references to synonyms ; (2) historical notes ; (3) a description of the tree ("Tradet"), including details of the long shoots, fruiting wood, spurs, leaf-blade, petiole, stipules, flower-buds, flowers, petals and pollen ; (4) a description of the fruits ("Frukten"), noting the size, shape, greatest width, calyx, sepal, eye, stalk, skin, ground-colour, scent, core, seeds, tube, styles, flesh and vitamin C content ("Askorbinsyrehalt") ; (5) period of maturity and use ("Mognadstid och användning") ; (6) cultivation ("Odling") with reference to the fruit-growing zones of Sweden mapped on pages 16–17. In Vol 2 something like 80 varieties of Pears and 58 varieties of Plums are described in the same detailed way, characters from the stones of Plums being included. A sectional line-drawing illustrates the fruit of each variety and these are supplemented by a number of coloured plates and photographs. They make the work a valuable guide to the identification of fruits, even for those who do not read Swedish, but it should be noted that in many instances the coloured plates do not correctly depict the colour of the varieties as grown in Britain. Thus 'Blenheim Orange' Apple (plate 26) is portrayed as a very bright fruit, while 'Doyenné du Comice' Pear (plate 53) is much too dull. As colour is a variable character, it may be that the plates reasonably represent the colour of such varieties when grown in Sweden. It is much to be regretted that there is unlikely to be forthcoming an English translation of this carefully written and handsomely produced standard work.

J. M. S P. & W. T. S.

"The A.B.C. of Vegetable Gardening." By W. E. Shewell-Cooper. 292 pp. 4 plates in colour, 8 black and white plates, numerous line-drawings. (Hodder & Stoughton for English Universities Press, 1947.) 4*s.* 6*d.*

This is a clear, simple and nicely produced little book on the rudiments of vegetable cultivation, first published in 1937 and now revised. The advice given is sound on the whole, but all through the book there are statements, none however of fundamental importance, which might well have been qualified or omitted, being somewhat misleading as they stand. Thus it would be hard and unnecessary work to rub the soil for a hot-bed through a finely meshed ("eighth-inch") sieve, as suggested on p. 58 ; a sunken hot-bed is not "always better" than a raised hot-bed ; ridges for the winter should run down the slope of the land, not necessarily north and south ; a soil so light as to break up and spread as in the illustration on p. 16 would need no ridging ; 2 oz. of basic slag to the square yard would be a very light dressing, 4 to 6 oz. being usually applied. Such examples could be easily increased.

"Suppression of weeds by Fertilizers and Chemicals." By H. C. Long & W. E. Brenchley. 73 pp. + Appendix, with 14 figs. and 16 plates. (Crosby Lockwood, 1946.) 6*s.*

This book is a revised and enlarged second edition of Long's earlier book, published in 1934. The revision has now been carried out by Dr. Brenchley, who for so many years has taken such a keen interest in the weeds of field crops and their eradication.

New chapters have been written as the range of chemical substances used has been extended to include the nitro-cresols and the substituted phenoxy acetic acids, amongst the latter group of compounds are those which show selective action in regard to their effective toxicity at low rates of application. This revision was, however, largely, if not completely, carried out before the publication of part of the results of the tests made for the Agricultural Research Council. The authors have included as an Appendix part of this information, collected and summarised by Professor G. Blackman. Unfortunately, the garden tests made at Wisley, at the Golf Green Research Station and elsewhere, are rather too recent to be included in this edition. The horticultural reader may not therefore find reference to his perennial weeds in their relation to the newer weed killers, based on growth substances, but he will be able to read of the effect of many other substances on the weeds he may wish to destroy. The subject-matter is arranged from the chemical view point, but a good index permits ready reference to the plants.

The drawings and photographic illustrations are clear and helpful. The references to the literature afford an exellent introduction for the student to the classical papers dealing with this subject. The publishers have priced the book reasonably.

M. A. H. T.

" All about House Plants." By Montague Free. xiii + 329 pp. 8vo. Ill. (Macmillan, London, 1946.) 18*s*. net.

The title page tells us that this book deals with " Selection, Culture and Propagation " of House Plants " and how best to use them for decorative effect."

It is long since a book dealing solely and fully with plants growing in the dwelling-house appeared in English. Here now is one that really does fulfil its aim and tell us all about house plants. How large is the number of plants capable of growing in dwelling-rooms may be judged by the lists, each item usually occupying one line, covering pages 285 to 304 inclusive. Some of the plants are unusual in such surroundings. We do not, for instance, often see *Saintpaulia ionantha* so grown, but all are practicable and we feel sure the book will give even the experienced in this phase of gardening many a useful hint.

The book was written in America and at least one term will prove (fortunately) unfamiliar here. It is terrarium. The author confesses to his preference, which coincides with ours, for Wardian case, a name hallowed by long use, preserving the memory of the man who devised a very useful method of preserving plants in difficult surroundings.

Dwellers in flats should find this a most useful book and so also will those who desire to know about such old conceits as bottle gardens. The illustrations are often very helpful. Some of them are (not very successfully) coloured, but it is a book which we can unreservedly recommend.

F .J. C.

" Soil Fertility Renewal and Preservation." By E. Pfeiffer. 196 pp. Illus (Faber and Faber.) 12*s*. 6*d*.

The author has been studying and applying for years Steiner's bio-dynamic method of plant cultivation, and the present volume is an English edition of his American book entitled " Biodynamic Farming and Gardening," which was published seven years ago. The essence of this method is the fertilizing of crops with a humus derived from the decay of vegetable and animal matter, the bacteria and other soil organisms in the humus being in a living and active condition. Like Sir Albert Howard, he considers that chemical fertilizers if not useless are often harmful in producing crops which may be injurious to the animals feeding upon them. We assume this would also apply to human beings eating the food so produced, and indeed towards the end of the book the author cites the opinions of a number of medical men who give evidence to this effect from their patients.

But apart from such extreme views there are many useful hints for farmers and horticulturists contained in Mr. Pfeiffer's book. Thus he indicates the wastefulness so usual in stacking dung in such a way that much of the goodness is lost by allowing the liquid constituents to drain away into the farm yard. He also advocates the digging or ploughing in of dung as soon as it has been spread on the field. He gives very useful hints, too, as to the best way of building up manure heaps in the farms so as to get the maximum value out of this precious material. He is equally helpful in his advice concerning the method of constructing and enriching the compost heaps and refers to the beneficial influence of using certain secret preparations which accelerate the fermentative changes that go on in decaying masses of vegetable matter. It seems a pity that the nature of these preparations should be kept secret, though they are available for any farmer who applies for their use. The directions for making them are, however, reserved for "bona-fide biodynamic farmers of standing." Towards the close of the volume he tells us that Chamomile stimulates the fermentation of yeast cells, which might perhaps indicate that it may be useful in composting too. Apparently tomatoes grow well in a compost made with the remains of tomato plants, while cauliflowers are not benefited by a compost made with cauliflower plants.

A good deal of information is given about the interaction of one growing plant on others growing in the proximity. Those which have a beneficial effect he would use as "border plants." The dead nettle and valerian are recommended as such.

A very interesting chapter deals with forestry and many arguments are given against the prevalent habit of "monoculture" as likely to cause the spread of diseases. The author also advocates the planting in mixed forests of the false Acacia (Robinia), one of the few leguminous trees which will grow in a temperate climate, and which enriches the soil by its nitrogen storing root tubercles.

Altogether much useful information can be gathered from this book. It is certainly worth studying and pondering over. It is written in a clear and readable style and will repay serious consideration.

F. E. W.

"British Herbs and Vegetables." By G. M. Taylor. 48 pp. 4to. Col. pl. (Collins, London, 1947.) 4*s.* 6*d.*

One of the excellently produced books in the "Britain in Pictures" series, this gives a short account of the vegetables and herbs grown in our gardens as they have developed from their wild ancestors Many of them are illustrated in the form in which our ancestors knew them with coloured or black-and-white figures reproduced from old manuscripts and early printed books, mostly of British origin. In no instance are the steps detailed by which these plants have reached their present form, though here and there the author has pointed out what he regards as critical times in that development. The methods by which the results have been achieved have doubtless been almost all empirical, and though something is now known of the laws of inheritance they have not yet been applied to any great extent and we largely depend upon chance seedlings for the betterment of our vegetables. It is an interesting fact that very few new plants have been discovered to take their place among our vegetables since Elizabethan days.

F. J. C.

"Occasional Publication on Scientific Horticulture," No 5. Edited by R. T. Pearl for the Horticultural Education Association. (Obtainable from Gibbs and Sons, 16 Orange Street, Canterbury. 4*s.* 3*d.* post free.)

This volume contains many valuable contributions on the application of scientific research results to Horticulture, particularly in the fields of mineral deficiencies and disease control. Among many others there are important articles by Professor T. Wallace on Mineral Deficiencies in Fruit and Vegetable crops, by Dr. T. Swarbrick on growth-promoting substances, the subject of the recent most interesting "Masters Memorial" lectures to the Society, by Dr. H. Martin on D.D.T. and other new Insecticides. Visitors to the demonstration of horticultural machinery at Wisley will find interest in the account by Mr. P. E. Cross of Mechanisation in Horticulture. There are also reviews of Horticultural films and recent books.

It is welcome news also that *Scientific Horticulture* will appear again in the autumn and will be published by Messrs. Jarrold, of St. James, Norwich, to whom subscriptions may be sent. The price of the forthcoming number will be 10*s.* plus 6*d.* postage.

"Saturday in my Garden." By F. Hadfield Farthing. Third edition revised by A. Cecil Bartlett. (Macdonald.) Ill. 10*s.* 6*d.*

The first edition of this book was printed in 1911; since then it has been many times reprinted and twice revised. Like many books which aim at surveying the whole field of horticulture in a small space, much is inevitably left out, but this book presents a reasonable compromise and should be helpful to those who are beginning gardening. It is illustrated by useful diagrams.

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JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

Vol. LXXII Part II

November 1947

SECRETARY'S PAGE

Programme of Meetings.—The following Shows will take place during November and December :—

Tuesday, November 4—12 noon to 6 P.M.
Wednesday, November 5—10 A.M. to 5 P.M.
Tuesday, December 2—12 noon to 6 P.M.
Wednesday, December 3—10 A.M. to 5 P.M.

In conjunction with the former Show the British Carnation Society will hold a Competition. Applications for the schedule should be addressed to the Hon. Secretary, British Carnation Society, 23 Russell Chambers, London, W.C. 2. At the Show on December 2 and 3 there will be a Late Apple and Pear Competition, schedules of which may be obtained from the Secretary.

Demonstrations at Wisley.—The following demonstrations will be given at the Society's Gardens at Wisley during November and December, in each case the demonstration on the second day being a repetition of that on the first :—

Wednesday and Thursday, November 5 and 6.—Planting of Fruit Trees and Roses. (2 to 4 P.M.)
Wednesday and Thursday, December 3 and 4.—Pruning of Fruit Trees. (11 A.M. to 1 P.M.)

Lectures.—On Tuesday, November 4, Professor G. E. Blackman will deliver a lecture on "Recent Developments in the Control of Weeds," and on Tuesday, December 2, Dr. Janaki Ammal will speak on "Chromosomes and Horticulture." Both these lectures will be given at 3 P.M. in the Lecture Room in the New Hall.

Calendar for 1948.—Arrangements have been made to hold the following Shows in 1948. Lectures are being arranged to take place on the afternoon of the first day of each Show, except Chelsea Show. As in the present year, each Show, except Chelsea Show, will last two days.

Calendar of Shows

February 17 and 18	Fortnightly Show. (Annual Meeting at 3 P.M.)
March 2 and 3	Fortnightly Show.
March 16 and 17	Fortnightly Show.
April 6 and 7	Fortnightly Show.
April 13 and 14	Daffodil Show.
April 20 and 21	Fortnightly Show.
May 4 and 5	Fortnightly Show.
May 26, 27 and 28	CHELSEA SHOW.
June 8 and 9	Fortnightly Show.
June 22 and 23	Fortnightly Show.
July 6 and 7	Fortnightly Show.
July 20 and 21	Fortnightly Show. Summer Fruit and Vegetable Show.
August 10 and 11	Fortnightly Show.
September 7 and 8.	Fortnightly Show.
September 21 and 22	Fortnightly Show.
October 5 and 6	Fortnightly Show. Autumn Fruit and Vegetable Show.
October 19 and 20	Fortnightly Show.
November 2 and 3	Fortnightly Show.
November 30 and December 1	Fortnightly Show.

Distribution of Seeds.—Attention is drawn to the enclosures in this JOURNAL with reference to the distribution of surplus seeds from Wisley. The closing date for the receipt of applications for seeds is December 31. Any application received after that date will not find a place in the ballot, except in the case of Fellows overseas, for whom a proportion of the available seeds is being reserved in order to allow for the great delays in postal deliveries from distant parts of the globe.

1947 EXAMINATIONS

NATIONAL CERTIFICATE IN ELEMENTARY HORTICULTURAL PRACTICE.—The written and practical parts of the Examination for the National Certificate in Elementary Horticultural Practice were held in July. There were 77 Candidates, of whom 70 passed and were awarded the Certificate.

EXAMINATION FOR TEACHERS OF SCHOOL GARDENING.—The written parts of the Examination for Teachers of School Gardening were held in July, and the practical part of the Final was held at Wisley in September. At the Preliminary Examination there were 121 Candidates, of whom 68 satisfied the examiners that they should be allowed to proceed to the Final Examination when they have had three years' experience of teaching school gardening.

Eighteen Candidates presented themselves for the Final Examination for Teachers of School Gardening, and the following 14 passed :—

Mr. H. S. Baucher.	Mr. C. C. Lamb.
Miss D. E. Beasley.	Mr. H. F. Munday.
Mr. D. A. Cliff.	Miss A. L. Reid.
Mr. K. J. Crapp.	Mr. J. S. Robinson.
Miss N. A. Field.	Mr. T. H. Thomas.
Mr. J. W. Gomer.	Mr. J. F. H. Walker.
Mr. M. Jackson.	Miss N. D. Wood.

Botanical Magazine.—We are glad to be able to announce that arrangements have been concluded with Messrs. WATERLOW & SONS for the *Botanical Magazine* to be printed in colour collotype. It is hoped that the first part of the new Series, Volume 165, will be ready in time for Christmas this year and thereafter succeeding parts will be published regularly each quarter. The costs of this process, which should ensure excellent reproduction, will be heavy and so it is hoped that as many Fellows as possible will support the magazine by becoming subscribers, giving subscriptions to their friends and recommending it to others. Each part will contain coloured plates of eleven new plants made from drawings by Miss LILIAN SNELLING and Miss ROSS-CRAIG, together with a comprehensive and authoritative text. An endeavour has been made to increase the cultural details in each part. The *Botanical Magazine* is one of the oldest magazines in the country, having been founded by WILLIAM CURTIS in 1787 and published continuously since then except for certain delays, due to war. The editorship of the Magazine has now been taken over by Dr. W. B TURRILL, Keeper of the Herbarium at the Royal Botanic Gardens, Kew. Subscription rate to the *Botanical Magazine* has been fixed at £4 per annum or £1 per part, post free, and subscriptions may be sent direct to the Secretary. A prospectus, which will contain a specimen plate, is in course of preparation and will be sent free, on application to the Secretary.

Back Numbers of the Journal.—Several recent issues of the JOURNAL have already become scarce and, as the Society is often asked to supply parts to Fellows desirous of completing their sets, the Secretary would be grateful if Fellows who have no further use for them would be good enough to return any or all of the following numbers :—

January to May 1946, inclusive.
May 1947.

Postage will gladly be refunded.

WISLEY IN NOVEMBER

THIS month, traditionally one of fogs and damp, generally suggests drawing closer to the fire rather than inspecting the Gardens, but for the keen horticulturist anxious that his own garden should contain plants of interest at all seasons of the year, a visit to Wisley will be well repaid, while for those not wishing to venture on a full tour of inspection, the glasshouses will display a wide variety of flowering plants. This season also, as long as the weather remains free from severe frost, is one of great activity where alterations and large-scale replanting are being undertaken, and visitors will see the changes being wrought along the old Rose border near the entrance where the beds are being re-designed to accommodate a display of formal bedding, a branch of horticulture not previously practised at Wisley, while the Roses are being used to fill the gaps in other beds along the Rose walk. When moved in the early autumn Rose bushes of a considerable age generally transplant satisfactorily and they form a valuable source of cut flowers where room can be found for them in the reserve garden.

Few shrubs will be found in flower during this month, but the large specimen of *Viburnum fragrans* in the Award of Garden Merit collection will be opening its delightfully scented pale pink blossoms during every mild spell from early November until April and the autumn flowering form of *Prunus subhirtella* produces its first flowers in late November and December. When planting winter flowering shrubs every effort should be made to provide an evergreen background for those which flower on leafless twigs, and if possible they should always be so arranged that inspection of their blossoms can be made from the windows of the house or from a well-paved path, as few except the keenest gardeners will care to cross a wide expanse of wet and frosty grass to enjoy the scent of one of the winter-flowering shrubs we value so highly.

Whatever the weather may be we can always spend a delightful hour in the greenhouses. In the Half Hardy House the last of the hybrid Nerines are in flower, with the dainty grass-leaved *N. filifolia* whose frilly, pink flowers are amongst the last to appear, while *Lithospermum rosmarinifolium* and the yellow *Calceolaria Pavonii* trained on one of the roof supports, will continue to flower throughout the winter, but the long display of blossoms from the hybrid Abutilons trained on the end of the house and from the bushes of *Fuchsia microphylla* planted in the beds are nearing the end. Two interesting bulbous subjects also in flower are *Cyrtanthus Mackenii* var. *Cooperi* (*lutescens*) with tubular, pale yellow flowers and *Tulbaghia pulchella* with long-stalked mauve umbels.

The Temperate House has a striking plant of *Tibouchina semidecandra* on the centre bed near the door which produces its deep purple blossoms with great freedom until the limitations of space render a severe spring pruning necessary. The first Acacias often open a few yellow balls this month and the many plants of *Camellia Sasanqua* and *C. saluenensis* are already in flower; the former is also flowering in the open, but the protection of the house allows the blooms to open undamaged by the weather. On the centre bed large plants of *Epacris impressa* and *E. ardentissima* are producing long spikes of tubular flowers and *Erica canaliculata* will be covered with pearl-white blossoms. Other flowers include the orange spikes of *Cuphea micropetala*, the white sprays of the aromatic shrub *Barosma lanceolata*, and numerous pots of Epacris, Ericas, Pelargoniums, and Camellias on the side benches. Outside the lower door will be found a large shrub of *Poncirus trifoliata* (*Aegle sepiaria*) carrying a crop of small orange-like fruits amongst its green stems and prominent spines. Here also the largest specimen of *Parrotia persica* in the gardens will still be carrying most of its gloriously autumn-tinted foliage.

Taking the path towards the Azalea Garden where much of the crimson foliage is already scattered we pass the Viburnum collection before entering Seven Acres at the lower end. The many Berberis will repay closer inspection ; crimson leaves and fruit are often found on the same shrub, as with *B. Jamesiana,* while others like *B. dictyopylla* have grey-blue, farina-covered branches as a background to their autumn tints.

The late-ripening Cotoneasters are becoming more prominent, particularly the evergreen *C. lactea* with sealing-wax red berries and dark green foliage, the related *C. serotina* and the free-berrying *C. salicifolia* var. *floccosa* with a delightful weeping habit which always suggests waterside planting.

Passing to the Erica Garden we see the prominent buds of the *E. carnea* varieties and *E.* × *darleyensis,* the earliest of which will have already commenced to colour, surrounded by the warm russet of the faded flowers of *E. vagans* and the many forms of *Calluna vulgaris,* while a few purple bells still linger on *Daboecia polifolia* (*cantabrica*) var. *purpurea.* Beyond the Ericas the many shades of crimson and yellow from the bed planted for autumn colour which we noted last month provide a striking background to the russet and pink of the Heath Garden.

Turning into the Wild Garden the most prominent shrubs are the many Vacciniums which thrive under woodland conditions. Few trees or shrubs can compare with them in a season when they colour well, yellow and scarlet being generally the predominant shades. Here also will be found a large specimen of *Oxydendron arboreum* and an even larger *Liquidambar styraciflua* both of which colour brilliantly, while the last blossoms of *Gentiana sino-ornata* still open on sunny days.

In the Rock Garden few flowers except perhaps Crocuses, *Schizostylis coccinea* and the red spikes of *Polygonum affine* have escaped damage from the weather, but if the autumn has been mild *Saxifraga Fortunei,* the last of this large genus to bloom, and *Iberis semperflorens,* a perennial white candytuft which flowers regularly every winter, will still be in flower on the lower part of the Alpine Meadow. Near the Alpine House the beds containing Crocus species are well worth visiting when the weather is fine ; *C. niveus, C. iridiflorus* and *C. laevigatus* should all be flowering during this month, and in the house although flowers are not plentiful we shall probably find *Cyclamen ibericum* and *Saxifraga Fortunei.*

Other plants of interest will be found round the Laboratory walls where *Iris unguicularis* generally produces its first flowers during the latter part of this month and the fine old specimen of *Cotoneaster horizontalis* is again well set with berries.

Near the glasshouses a shrub of *Cotoneaster conspicua* var. *decora* is carrying an excellent crop of orange-scarlet berries which are brought into prominence by the slightly weeping habit of this by no means common variety.

The Vegetable Trial Grounds in Wisley village contain an interesting trial of main-crop Celery which will be fully mature this month, also a trial of Parsnips, and many Savoys, late Cabbage and other vegetables on trial for the Seed Imports Board.

CHOICE SHRUBS

By Michael Haworth-Booth

(*A lecture given on June* 17, 1947 : MR. R. D. TROTTER *in the Chair.*)

I WOULD term a choice shrub one which, first and foremost, provides a good mass of bloom of attractive form and colour. As the years pass one is apt to attach importance to rarity and even, perhaps, to difficulty of cultivation, but I think this is a temptation to be resisted. I would say that the really choice shrub is one which is outstandingly *garden-effective* if I may use the word. Next, this shrub of our choice must be hardy enough for average climate and soil and, especially, for our own particular conditions, to be a reliable contributor to the decoration of our garden at its given moment of the year. Furthermore it is desirable that the subject should have a certain degree of all-the-year-round comeliness. Hence we shall award extra marks, so to speak, to an evergreen, because the background and winter shelter these provide are necessary in the garden lay-out for both cultural and aesthetic reasons. Next I think we should like the form of the shrub to be a pleasing one in our landscape so that, when out of bloom, it is a handsome piece of garden furniture. Thus we shall look for either a compact, bosky, mounded habit of growth or a picturesque springing form with perhaps a graceful droop to the outer ends of the branches. Finally there is a last, and to my mind most important, requirement. That is that our choice must include shrubs to bloom in uninterrupted succession throughout the spring and summer months when we want our gardens to be at their best. Otherwise we should find ourselves with a fine riot of colour in May and a very dull garden for the rest of the summer.

In the more leisured days of the past when labour was more economically available the herbaceous border was often relied on to provide the colour after the spring shrubs were over. But, as it becomes more and more necessary to curtail maintenance work, we shall explore the possibilities of relying upon flowering shrubs alone for the whole summer flowering season with greater interest. For my own part I hold that not only are the flowering shrubs perfectly capable of providing a sequence of bloom throughout the summer but they can make an even better effect. If we are to do this successfully, however, there are one or two points which require careful watching. In the first place our space will require to be so carefully and intensively planted that there will positively be no room to spare for any subjects that do not definitely " pull their weight " at their appointed moment in the flowering season. In practice this means that many Cotoneasters, Berberis, Laurels, Aucubas, Conifers, etc., whose flowering is not sufficiently effective, have to be scrapped and replaced with brilliant flowering subjects. Then we must pay particular attention to catering for certain periods that are apt to be neglected. What is sometimes called " the June gap " is a case in point. Unless this is watched there is likely to be a frightful slump after the splendours of the May flowerers are over. But at least the remedy is simple: all we have to do is to sacrifice a little of that earlier profusion by replacing with shrubs which flower at the moment that the garden picture needs strengthening. I have battled with this problem for years and by probing about I have gradually found that there is quite a pleasing selection from which to choose your subjects and make that period as attractive as any other. To give some examples, we have *Cornus Kousa*, *Rhododendron indicum*, the *later-flowering* varieties of the Ghent and Knap Hill hybrid Azaleas, the Daisy Hill strain of *Cytisus scoparius* seedlings, early-flowering hybrid Roses, Rhododendron hybrids of *R. discolor*, *R. Griersonianum* and other parentage, and *R. obtusum* var. *Kaempferi* f. *Daimio*, most invaluable of all (Fig. 162).

When we come to later June there are better-known plants available —Roses, Deutzias, Philadelphus, Cistus, Tree Lupins, etc., provide plenty of attractive material. In favourable gardens *Hoheria Lyallii*, perhaps better known under the old name of Plagianthus, will be opening its beautifully-formed cherry-like flowers with their honeyed scent which is perceptible at quite a distance from the plant.

In July we have superb material in the Hydrangeas. In suitable soils their masses of purest spectrum blue rival the Delphiniums, and in slightly alkaline soils the white, red and pink varieties of *H. macrophylla* together with the gay crimsons and whites of the *H. serrata* varieties make a fine picture. Then in the yellow shades we have the late-flowering Genistas—*G. cinerea* and *G. virgata* and the larger Hypericums such as *H. patulum* var. *Henryi* and var. *Forrestii* and *H. Leschenaultii.* For a mass of warm crimson we shall find that a bed of cuttings of *Fuchsia magellanica* var. *Riccartonii* such as those so much admired at Kew, takes a lot of beating.

In August the later-flowering varieties of *Hydrangea macrophylla*, such as ' Bluewave ' open and most of the July shrubs, in particular the Hydrangeas, continue in bloom. The later Heaths will be at their best and the varieties of *Erica cinerea* will provide masses of rich colour in lime-free gardens. In those with a favourable climate *Eucryphia glutinosa* (often known as *E. pinnatifolia*) will offer one of the most unforgettable sights of the season, once it has had time to grow to flowering size and provided that we have been careful to select the single-flowered form and not the unattractive form with badly-shaped double flowers which unfortunately occurs so often in a batch of seedlings. Finally, as September begins, *Hibiscus syriacus* comes into bloom; it is a fine shrub but we have to be a little careful in its placing for its habit of growth is not particularly decorative other than at flowering time and it puts out its leaves rather late and thus looks rather forlorn in spring.

In the later months the Hydrangeas whose sepals remain on the flowers and turn through various strange shades of green and maroon to a final buff colour, the autumn tints of the foliage of Azaleas, Japanese Roses, *Eucryphia glutinosa, Cornus Kousa, Hypericum patulum,* etc. all make the garden landscape pleasing to the eye against the evergreen framework. Such plants provide two different seasonal effects and are thus particularly worthy of our choice.

I have left the discussion of spring-flowering shrubs until the last as there is such a wide choice that all tastes can be catered for. But I would like to put in a plea for more of you to adventure with the Azaleas. I think that many gardeners have given up hope when a little more care in initial preparation of the soil, selection of more shady spots for planting, and careful mulching with fallen leaves annually would have resulted in success. After all there are few flowering shrubs that produce such a wealth of glorious colour, whose flowers are so beautifully formed and fragrant and whose habit of growth leaves so little to be desired. Of course if the garden has a definitely limy soil one must be content with other things and so far as I know *Chaenomeles japonica* (formerly known as *Cydonia Maulei*) is about the best substitute if one enjoys the rich reds, oranges and scarlets, but the distant effect is rather poor in comparison. Undoubtedly a limy soil, that denies the gardener the rich orange-scarlet effects of the Azaleas in spring and the blue of Hydrangeas in late summer, is a severe handicap.

It will be noted that, although the shrubs are chosen for garden-effectiveness, a surprisingly large number are somewhat scarce. I think that this is because it is only comparatively recently that we have begun to choose our shrubs for year-round good looks and in particular for continuous coverage of the flowering season. This may well be divided into early spring, spring, early summer and late summer periods.

Let us start with the early spring period and mention a few outstanding examples. [*Simultaneously each subject was shown on the screen.*]

Magnolia denudata. Although it flowers too early to escape probable spring frosts, this Magnolia with its pearly white chalices is so beautiful that I prefer it to the better-known hybrid *M. Soulangiana*. In the southern counties it makes a fine specimen tree away from a wall but we do not see these often enough.

M. mollicomata. This is rather an unusual treat. Our President informed us at the Shrub Conference that this species flowered with him in twelve years from seed and I think that he was the exhibitor of this fine specimen, but it was some years ago and I do not remember the details.

Camellia japonica. I think most gardeners are agreed now that the Camellia varieties of this type are perfectly hardy although they may lose a few flower buds in hard frost. I find the base of a north wall one of the best places for them as they do not care for the sun or drying winds. After all I know nothing nicer to plant on either side of your front door. They also grow well, of course, in sheltered places shaded by tall trees.

C. japonica var. 'Lady Clare.' This variety has particularly beautiful pink flowers, especially indoors by artificial light on the dinner table. But it is a very lax-habited grower and on the whole I prefer the variety 'Adolphe Audusson' which has a strong upright habit and a slightly more double flower in a true red.

Rhododendron Nobleanum. The specimen shown, also known as Waterer's hybrid 406, is one of the three forms of this plant fairly commonly seen. It blooms in April and has a particularly valuable garden quality in that it keeps back a good number of its rose-red flowers so that if the first lot get frosted it has another batch ready to open later at a more favourable moment.

Prunus serrulata var. *mutabilis.* It is difficult to choose which is the more beautiful, this Cherry or Sargent's Cherry. Forms vary enormously but on the whole I think that the variety *mutabilis* is the loveliest. Unfortunately it is hard to get in a good form as demand was so small that many leading propagators of Cherries gave it up. The individual white or pink flowers are small but produced in great quantities, and make a delightful contrast with the bright copper of the young unfolding leaves.

Rhododendron lacteum. Here is a very choice shrub indeed and a rich yellow superlative truss of it too, but it is a difficult and rare plant. It flowers in April. As with the majority of flowering shrubs there is a wide difference in the quality of the various forms, some poor ones are only a yellowish-white. It is a shrub for the experienced grower with a wood-garden.

Kurume Azaleas. These are mostly forms of *Rhododendron obtusum* and are among the most perfect miniature shrubs for the small garden, so long, of course, as the gardener is not cursed with a limy soil. There are pink, white, red and orange varieties and they make a charming picture in spring among Forget-me-Nots and other small plants which provide a living mulch and help to keep the soil at the roots cool.

Prunus serrulata var. 'Hokusai.' The main crop of Japanese Cherries will now be in bloom and this variety is one of the best owing to the attractive shape of the blossoms although these are only a pale blush-pink in colour.

P. serrulata var. 'Tai Haku.' This variety actually flowers about a week before the last named. The single white flowers are very large and shapely and the young foliage opening at the same time is bronze-coloured. I think that it is perhaps the finest of the white-flowered garden forms. It is a good grower and would make a welcome change from 'Kanzan' for street planting.

Azalea mollе-japonicum hybrids. Now we come to the period of spring proper and to what is probably far the finest flowering shrub for massed colour effects. I do not know anything that can equal the brilliance of the soft but rich tones of yellow, orange and scarlet that these well-known shrubs can provide. Yet I would say that they are the most 'mis-cultivated' shrubs that there are, if I may coin the word. The feeding roots of the Azalea should be on the surface, covered only by a mulch; when they are buried beneath heavy soil the plant suffocates and dwindles annually. When properly planted these Azaleas are good growers making shoots several feet long *from the base* each year with strong 6-inch growths from the older branches as well. A lime-free soil with plenty of humus is, of course, necessary.

Magnolia sinensis. This species belongs to the *M. Sieboldii* section and appears to be a strong growing, healthy and beautiful tree. It flowers with the main section of the "mollis" hybrid Azaleas and makes a charming contrast.

Rhododendron yunnanense. This is one of the best species for the garden. The form I like best has white flowers with a red blotch. It seems reasonably hardy in the open although listed as only category "B" in the *Rhododendron Hand-Book.*

Daphne Cneorum. This is a delightful Daphne but, unlike the majority of the shrubs dealt with here, it is not reliable as a permanency. The nice group shown did not survive the neglect of wartime. Possibly the plant exhausts some element in the soil or perhaps its constitution is weak, I do not know, but it is rare to see really aged clumps.

Rhododendron campylocarpum. This is an attractive species for the wood-garden. Of the two forms listed the original type with clear yellow' flowers and compact habit seems to me much the better. The commonest is the var. *elatum* with duller flowers and a straggly habit.

R. × *Loderi.* This is about the finest of the hybrid Rhododendrons commonly obtainable. The specimen shown is grown at the foot of a north wall of the house and this sort of position suits it quite well provided that the plant has a good mulch of leaves annually and the hosepipe, trickling, whenever it looks dry whilst making its new growth.

R. × '*Dr. Stocker.*' This is an attractive variety for the wood-garden, the result of a cross between *R. caucasicum* and *R. Griffithianum.*

R. Elliottii × *Shilsoni.* This is a lovely wood-garden hybrid. Presumably bred from Kingdon Ward's crimson-scarlet form of *Elliottii.*

Viburnum Carlesii. This is becoming quite a popular shrub but, although its fragrance is delightful the foliage and habit are not very good. In some seaside gardens it is very lovely, but inland in exposed positions there are apt to be browned flowers spoiling the appearance of every truss.

Malus floribunda. This fine old variety takes a lot of beating but

I find it best to give up all hope of making it look like a tree and just let it form a rounded shrub as it wants to do.

Chaenomeles (*Cydonia*) *japonica*. This specimen was photographed near the lake at Wisley; it is an excellent garden shrub and probably the best substitute for those whose limy soil precludes the growing of the Azaleas. There are bright orange-flowered varieties too, but some of these tend to smother their blossom with new growth and so a rather poor soil seems to be indicated. This is, of course, the dwarf Japanese Quince which used to be called *C. Maulei*, not the old 'japonica,' as people often called it, which is now *C. lagenaria*. The subject of our picture is seldom more than 3 feet high while *C. lagenaria* will make 10 feet in the open and much more against a wall.

Pieris Forrestii. I am afraid that the specimen shown is not obliging us by showing its panicles of white bell flowers at the same time as the red young growths appear, as it is still somewhat young. It is a most handsome shrub for an acid or neutral soil.

Knap Hill Hybrid Azaleas. Here we show some young plants of those fine varieties which were such a feature of the Chelsea Show. These are now bushes about 4 to 7 feet high, depending on the variety, and are ideal plants to carry on the effects of massed colour after the 'mollis' types are over. I understand that the Society is making trials of Azaleas of this kind, so fellows will be able to watch the plants at Wisley and make their choice.

Davidia involucrata. This always attracts attention when exhibited, but although interesting owing to its rarity in its Chinese home and its curious appearance, it does not make any appeal to the eye as a decoration of the landscape. The picture shows the top of the fine specimen growing at Grayswood Hill, Haslemere.

Genista hispanica. This is a very useful shrub for a mass of good rich yellow and, like the dwarf Quince, makes a substitute for the Azaleas for those who garden on limy soil.

Romneya Coulteri. As often happens this plant was produced from a wandering root from a parent plant some distance away. It just popped up through the gravel path. It is perhaps on the borderline between the true woody shrubs and the herbaceous plants.

Rhododendron × 'Britannia.' Here we typify the hardy hybrid Rhododendrons, indispensable for specimen plants and backgrounds in every non-limy garden. 'Britannia' is a fine red with very handsome foliage of a bright rich green. Shade from distant large trees is desirable for the flowers to last long on the plant and keep their colour, and proper feeding with an annual mulch of dead leaves is necessary for good growth.

Rosa xanthina. This is an attractive wild rose species from China. The yellow flowers appear in early June. It seems to be reasonably hardy.

Viburnum tomentosum var. *plicatum*. In our seasonal cycle of bloom we are now nearing the "June gap" and so this fine variety is particularly welcome. It flowers notably later than the equally fine var. *Mariesii* (Fig. 164). To get a shapely habit, pinching and pruning in the earlier stages are helpful.

Cytisus scoparius var. This is a pleasingly coloured seedling with soft buff flowers that I photographed at Wakehurst. Too often these garden varieties of the common Broom have two colours which cancel one another out at a little distance. There is room for more selfs in different colours and, particularly, I think, for the later-flowering varieties, invaluable for their coverage of the " June gap," which were raised at the old Daisy Hill nursery.

Lithospernum diffusum var. 'Grace Ward.' A charming dwarf shrub for the rock garden or the foreground of raised beds. It is not absolutely hardy but strikes easily from cuttings.

Paeonia suffruticosa. The Tree Peony is a gorgeous shrub but requires care in placing so that it is not excited into growth so early as to get the young growth cut by spring frosts. Coming from China it is said not to object to a limy soil. The latter plant shown was photographed in the late Mr. Mark Fenwick's garden at Stow-in-the-Wold. It does not seem to mind being frozen in winter at all.

Ghent Azalea 'coccinea speciosa.' These " Ghent " varieties are among the hardiest of the hybrid Azaleas and the latest to flower. They prolong the Azalea colour schemes so that they may be enjoyed almost up to the time the Roses, the next pre-eminent shrub for massed colour effects, come into bloom. I would recommend anyone who likes Azaleas but who finds the 'mollis' types too vulnerable to spring frosts for his garden to try the " Ghents." Shade is desirable as they seem to flower just as well and the flowers last twice as long on the plants.

Embothrium coccineum. I cannot quite make up my mind about this plant. The flowers are brilliant, but rather queer. The habit is somewhat thin and untidy. As it comes from South America the hardiest forms come from farthest south.

Magnolia Watsonii. Another very attractive Magnolia. It is a hybrid between *M. obovata* and *M. Sieboldii*, and has the best scent of any. In my view all the Magnolias of this section are much improved by quite hard pruning when young. The object is to encourage new growth from the base and cut away the nursery-grown wood completely as soon as possible, but the new shoot must be carefully protected from slugs.

We are now in the " June gap " in earnest and *Cornus Kousa* obliges us by flowering right in the middle of it. I think that the form shown is a particularly good one as the bracts, which look like petals, are beautifully shaped. In some forms these are thin and twisted, or as in some forms of the var. *sinensis*, gross and misshapen. *Cornus Kousa* is a good garden shrub and colours finely in autumn.

Rhododendron indicum. This little Azalea flowers at the same time as *Cornus Kousa* and makes a pleasing contrast with pink, red or orange flowers, depending on the variety. It is a Japanese species much used in the gardens of that country. I much prefer the single-flowered form to the double variety *balsaminaeflorum* (or *rosaeflora*) which has a rather artificial appearance and is somewhat stunted in growth.

Rose 'Nur Mahal.' The Rose as a flowering shrub has not received quite as much study as I think it deserves. 'Nur Mahal' is not quite strong enough to form a big permanent bush in the way that another Hybrid Musk, 'Felicia' does. We have the latter nearly 11 feet across and the effect, in bloom, is of an immense basket of roses. Grown as single specimens in turf-loam these shrub roses are remarkably healthy even without the spraying so necessary when highly-pruned bushes are grown in beds.

Styrax japonicus. This shrub is almost tree-like in habit and appears to be quite hardy. Without being very showy the delicate form of the flowers makes it a very attractive species if grown as a standard.

Rose 'Betty Prior.' Another useful shrub-rose but of the hybrid polyantha type. It is remarkably floriferous and the flowers last, untarnished by rain or sun, for a very long time.

Cistus Loretii. A hybrid between *ladaniferus* and *monspeliensis.* It has the merit of keeping its flowers on during the afternoon. Many kinds drop them all too soon. A winter like the last takes a fearful toll of the Cistuses and I cannot really say that I have definite proof that one species is much more winter-hardy than another but it does seem that those grouped closely together suffer less than the more exposed specimens. *Cistus populifolius* var. *lasiocalyx,* with large white flowers and bright evergreen foliage is a favourite but I think we have lost them too and also all the cuttings in the frames although these were well rooted. It is not, therefore, a shrub to count upon for permanent effects but one to enjoy, in odd corners, while we may.

Tropaeolum speciosum. I should not like to do without this delightful little climber. After these red flowers it produces blue seeds which we fling carefully into the Rhododendron beds. Where our aim has been fortunate the resulting masses of scarlet are very welcome from midsummer onwards.

Hoheria Lyalli. July is now beginning in our calendar of blossom and the honey-scented flowers of this shrub are very pleasing. In cold gardens some stems may be lost in a hard winter but it usually shoots up again well from the base. Seedlings vary but are mostly good and grow very quickly to 9 or 10 feet.

Potentilla fruticosa. I have put this shrub in at this point although, if the spring is a hot one it will often be in flower earlier. It is quite a useful and attractive little thing though it makes no great show.

Philadelphus var. 'Virginal.' It is a pity we have to give up the charming name of Syringa for this family but it is the correct name for the Lilac family. Mock-orange is another English name for these fragrant shrubs. The variety 'Virginal' is a very popular one but, personally, I much prefer 'Belle Etoile' as having a more attractive habit of growth and a more shapely flower. There are a great number of varieties from which to choose.

Rose 'Lady Waterlow.' This is one of the nicest of climbing Roses giving three crops of bloom each season if well fed. The flowers are pink and agreeably fragrant and the growth not too rampant. I do not know a better Rose for a house wall.

Philadelphus Delavayi. This is a late-flowering form of this species which is useful in prolonging the valuable garden quality of fragrance. The specimen shown decorates one of the walls of Hascombe Church.

Senecio laxifolius. This shrubby groundsel with its decorative silver leaves lightens up dark corners when planted in the sunnier foreground in a very attractive manner. Perhaps its most decorative moment is actually before the flowers open. Last winter proved too much for the hardiness of most specimens but enough survived to provide ample cuttings for next year.

Genista cinerea. One of the finest of the Broom family and flowering at a time when few really vivid shrubs are in bloom this is one of the indispensables. It suffered little if any last winter and is one of the best specimen shrubs for a key position.

Spartium junceum. Here we have another indispensable late-summer-flowering Broom. To make a good bushy specimen it requires an isolated position and stern nipping back when young and annually.

Rhododendron × 'Romany Chal.' This gorgeous Rhododendron makes a fine splash of scarlet in the wood-garden at this moment, which in our cycle of bloom is now at about the middle of July.

Now we come to August and a new massed effect is wanted. The Hydrangeas offer us perfect material for the purpose.

Hydrangea macrophylla var. 'Générale Vicomtesse de Vibraye.' This is the Hydrangea which we rely upon for our massed effects this month as I know none which throws a purer blue more consistently. It is reasonably hardy and strikes easily from cuttings. The persisting flower heads make an attractive buff-coloured, flowery effect in front of the evergreen background in winter and the habit is bushy and good. Altogether a first-class garden shrub (Fig. 165).

H. macrophylla var. *macrosepala.* This variety with its large and shapely white flowers forms a nice foil to the preceding.

H. serrata var. '*Grayswood.*' This useful and attractive shrub has a pronounced Japanese flavour in its appearance. It is hardier than the varieties of *H. macrophylla* and remains decorative for a very long period. The flowers open pure white and then turn crimson and remain in this state on the plant almost up to Christmas. An ideal late summer shrub for the garden (Fig. 166).

Fuchsia magellanica var. *Riccartonii.* This old Fuchsia is very useful to provide a cloud of soft carmine red in late summer. An easy way to achieve this cheaply is to take a chance on having a mild winter and simply stick a bed full of cuttings in late summer. Let them bloom where they are and then cut them back afterwards to make them bushier next season.

Hypericum Leschenaultii. This St. John's Wort and *H. patulum* var. *Henryi* groups well with the preceding shrubs and helps the July and August display with its soft yellow flowers. It appears to be reasonably hardy.

Hydrangea macrophylla var. 'Bluewave.' This variety has the curious characteristic of flowering ten days or a fortnight later than the Hortensia varieties previously mentioned. It is also stronger in growth and slightly hardier, but I do not find that even last winter caused any casualties among any of these Hydrangeas. Drought, spring frosts and slugs are their chief enemies and one must do what one can to combat these to keep them growing strongly. I think a good turf-loam is the ideal soil for the Hydrangeas but vigilance is needed or grubs and slugs will destroy the young shoots essential to take the place of the older wood and so prevent dwindling.

Eucryphia glutinosa. This lovely plant is also an indispensable for those who can grow it. Care is needed firstly to ensure that the young plant is of the beautiful single form and not the unattractive double, then time is needed to grow the plant to flowering size. But once this is attained there are few more splendid things. The leaves colour well in the autumn and so the plant does double duty.

Erica cinerea. In a lime-free soil this fine native Heath and its brighter-coloured garden varieties make masses of colour with little trouble in maintenance.

Eucryphia nymansensis. A fine evergreen eventually making a tower-like tree about 20 feet high. Last winter it lost its foliage but has recovered. I hope that planters of seaside gardens on the warmer coasts will plant this tree for posterity and the pleasure of August holiday-makers in years to come. It grows fairly quickly but requires some years' growth to make a good showing (Fig. 169).

Eucryphia Billiardieri. This dainty little Eucryphia flowers when fairly small but is said to make quite a large tree ultimately.

We are now at the end of our allotted space and many fine shrubs have had to be omitted but I hope that what you have seen will have helped to show you the possibilities of an all-summer display with flowering shrubs alone.

The photographs to illustrate this lecture were taken by the author and the blocks have kindly been loaned to us by Country Life Ltd. The illustrations appear in the revised and enlarged edition of Mr. HAWORTH-BOOTH's book *The Flowering Shrub Garden* published by Country Life.

THE SPRING-FLOWERING BUDDLEIAS

By A. D. Cotton, F.L.S., V.M.H.

WITH a few exceptions the hardy cultivated Buddleias fall readily into two groups:—the early flowering species which flower on the old wood and the summer and late flowering species which flower at the end of the current season's growth. Four species of the former group are in cultivation, namely, *B. tibetica*, *B. Farreri*, *B. Sterniana* and *B. heliophila*.* In each the flower-buds are formed during late summer and are prominent during winter at the apices, and in the leaf axils, of the main shoots. With the exception of *B. Farreri* these species are not, however, familiar to gardeners. The first three have much in common, especially in habit and in shape of leaves; the fourth stands apart, and in its times of flowering forms a connecting link between the two groups. In order to ascertain the identity and correct names of the plants in question it has been necessary to examine a large series of wild specimens preserved in herbaria and to investigate the somewhat involved history and nomenclature of the first and third. These systematic researches will be recorded in a botanical journal, but as the names have now been settled and the plants are to be seen in cultivation, it may be useful to publish the following general account. The species are dealt with in the order of their date of flowering.

B. TIBETICA

This is the earliest of all the hardy Buddleias. It is a strong-growing, sparsely branched species, similar in habit to *B. Farreri*, but differing both in flowers and foliage. It commences to flower whilst the shoots are leafless towards the end of March and continues throughout most of April. The flowers are borne at the nodes of the previous year's shoots in very compact, sessile or subsessile clusters, which are spherical or slightly elongated in form. Before they open they are a deep purple in colour, but they soon turn pale and finally become white. The exterior of the corolla is usually eglandular but occasionally a few scattered glands are present. The foliage is very distinct. The leaves are commonly about four inches long and broadly lanceolate, but are variable both in size and shape. Their upper surface is minutely tessellated and shortly tomentose and as the tomentum persists for a considerable time they appear covered with a greyish-white bloom. The lower surface bears a dense white down and has prominent veins. The petiole is slightly winged. In summer the grey foliage distinguishes this plant at once from *B. Farreri*, the mature leaves of which are on their upper surface glabrous and deep green in colour. Owing to the density of the inflorescences the flower heads cannot be described as beautiful, but the very early and faintly scented blooms are welcome, and the grey foliage makes the plant a useful and interesting addition to the list of garden shrubs (Tab. A).

B. tibetica is a native of Tibet, the original specimen having been collected in the Llalung Valley, at 11,000 feet altitude. It was described at Edinburgh in 1911. The species was introduced to this country by LORD WIGRAM, who received a young plant labelled *B. hastata* from the Lloyd Botanic Garden at Darjeeling in 1931. Flowering shoots were exhibited under this name at a Royal Horticultural Society Show in April 1943. Though evidently closely allied

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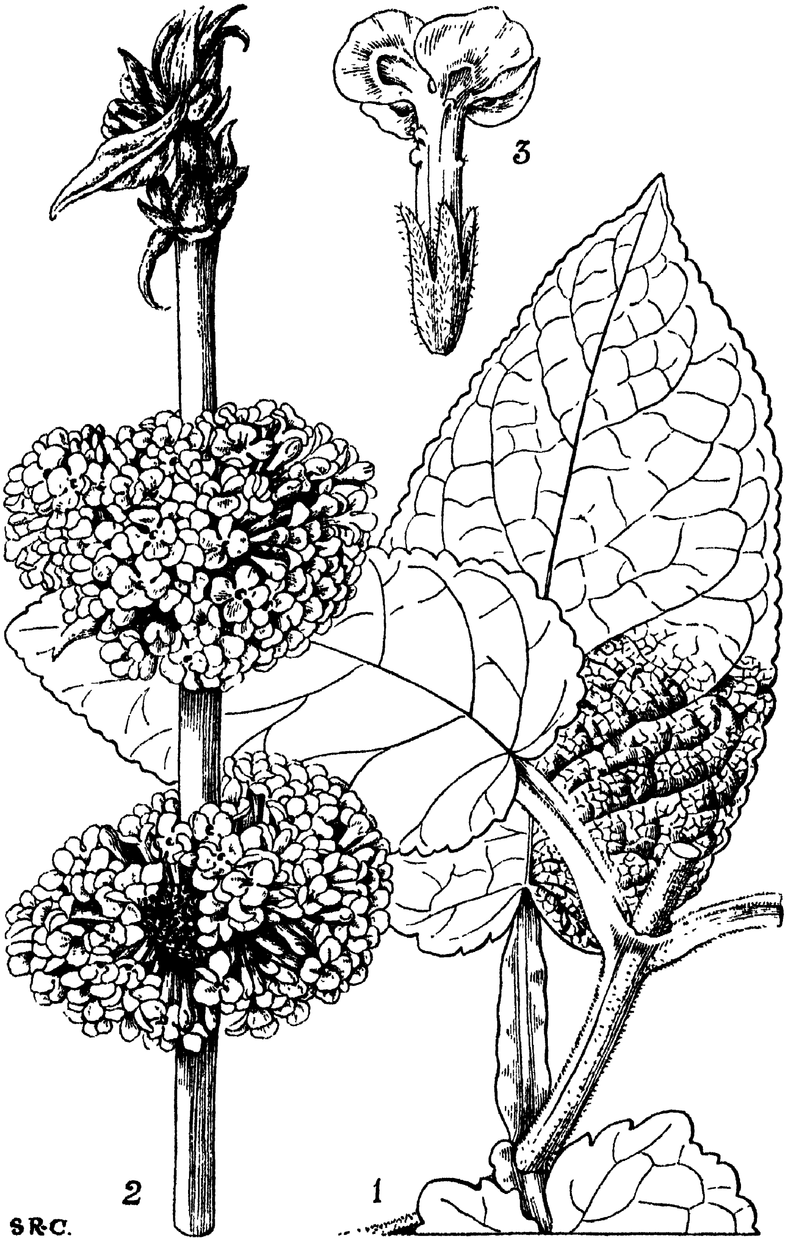
* *B. alternifolia*, though not closely related and flowering later, must also be considered as an early species since it produces its flowers on the long sprays formed the previous season.



TAB. A—*B. tibetica*

1. Leaf showing winged petiole and tessellated upper surface.
2. Compact heads of flowers on leafless shoot (See p. 428)

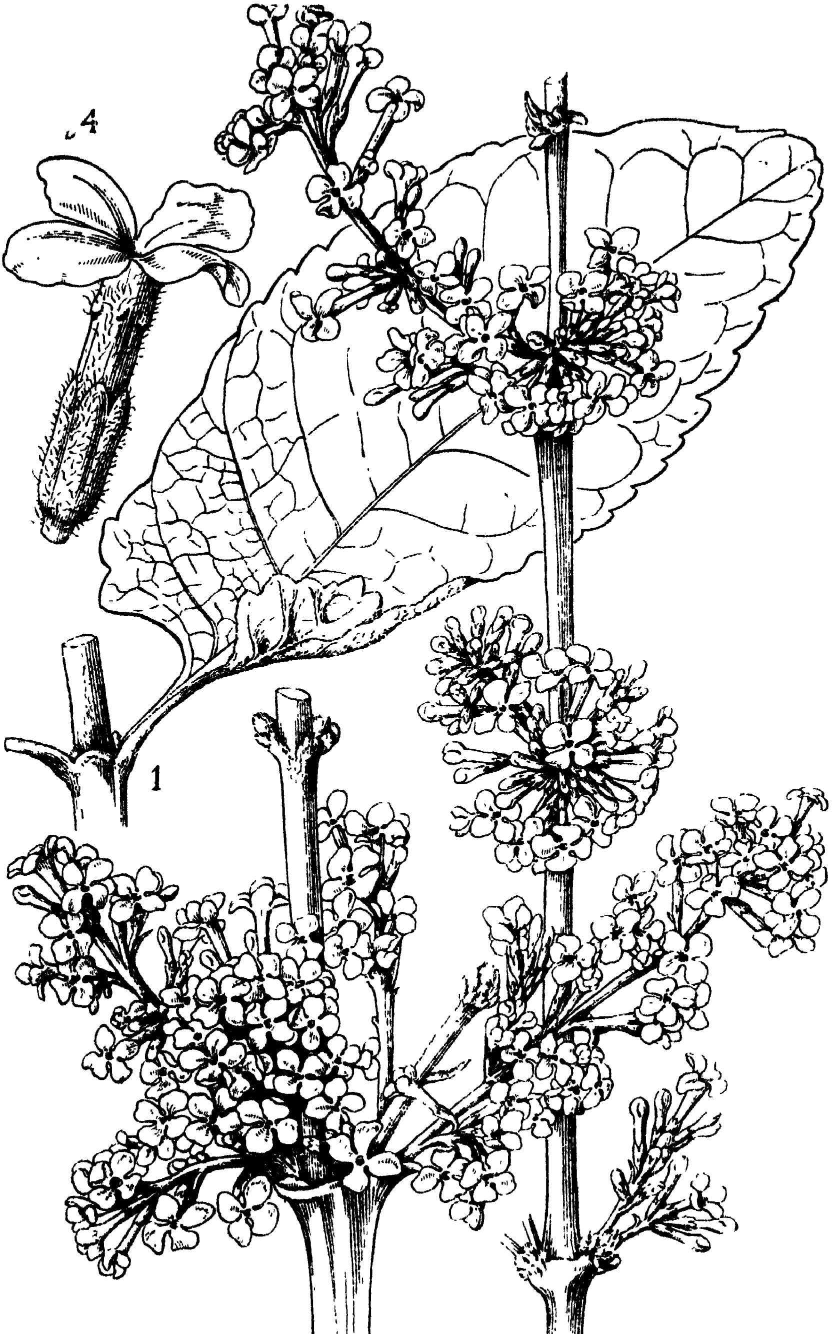
to *B. hastata*, which is also a native of Tibet, the Darjeeling plant differed from it in several particulars, notably in the smaller flowers. It was determined at Kew as *B. tibetica*, an identification which the author of the species, Sir WILLIAM WRIGHT SMITH, subsequently confirmed. Lord WIGRAM grew the plant on the bank of his moat garden at Windsor Castle, a position which showed off its fine grey foliage to full advantage. The photograph published by him in the R.H.S. JOURNAL (1943, p. 105), and reproduced here, shows its general habit. Cuttings from this specimen were sent to Kew, Edinburgh and elsewhere (Fig. 168). There is a fine specimen 11 feet high in the garden of Sir JAMES BURNETT OF LEYS, at Crathes Castle, Aberdeen, and another in Mr. H. S. YOUNGER's garden at Dunbar. The fact that it flourishes as far north as Aberdeen, where it has withstood a temperature of zero, shows that it is perfectly hardy.

The Windsor plant has never set seed and is probably self-sterile. Since all the plants grown in Britain are derived from this specimen they represent a single clone, and would consequently also be sterile to their own pollen. Cuttings are not easy to strike, but if a sand-frame is used young shoots taken in June can be rooted fairly successfully.

In this country, as might be expected, the species flowers two or three months earlier than it does in Tibet, and is visited by early flying bees. It is not surprising to find very compact flower-heads in a *Buddleia* occurring at great altitudes where the weather conditions are severe. The long showy flower-heads of the summer-flowering species are obviously more in keeping with lower altitudes and a more genial climate. These are probably visited and pollinated by members of the same group of butterflies which are so partial to them in this country, such as Peacocks, Tortoiseshells and Red Admirals, members of which group also occur in the East.

B. FARRERI

B. Farreri, which was introduced to this country about 30 years ago, is now to be found in most of the large gardens of England and Scotland. It is sparsely branched but rather less so than *B. tibetica*, and, judging by the girth of the main stems of old cultivated plants, must, if left unpruned, attain a large size. Like the previous species, *B. Farreri* bears its flowers at the nodes of the old wood, but the thyrses are laxer and longer, varying from 1 to 4 or even 5 inches in length. The colour is very pale lavender, but seen from a distance a plant in full bloom appears to be enveloped in a haze which is distinctly blue. The flowers, which open in April, are succeeded by handsome foliage. The leaves are white at first, due to a dense coating of hairs, but later become almost glabrous and deep green on the upper surface, though the lower remains white and tomentose. FARRER referred to the plant as "a noble bush with ample flannelly foliage." At Kew old specimens are to be seen on a wall and in the borders around the Temperate House, but the species is fairly hardy, although in very severe winters the shoots may be killed back. In the north it is only



Tab. B—*B. Farreri*

1. Leaf with even upper surface. 2 and 3. Leafless shoots with elongated primary inflorescence and secondary inflorescences arising from accessory buds (See p. 430)

half-hardy. The wealth of flowers in spring, and the fine foliage, especially when seen waving in the wind, make it a good garden plant.

B. Farreri is not burdened with synonymy. Dried specimens were collected by FARRER in Kansu in 1915, under No. F. 44 (the altitude was not noted but it was under 9,000 feet), and the species was named and described from one of these specimens by Sir ISAAC BAILEY BALFOUR and Dr. W. WRIGHT SMITH in 1916. Seed was sent home under the same field-number and all the living specimens in Britain are derived from this seed or from its descendants. The plants raised in this country have served to clarify our views for, as will be seen from the description in the *Botanical Magazine*, tab. 9027, which has been followed by REHDER and by MARQUAND the method of flowering was formerly completely misunderstood. (*Cf.* present figure, B.) Unlike *B. tibetica*, *B. Farreri* sets seed copiously and, since isolated single plants are known to produce good seed, is evidently self-fertile.

The flower-buds may be seen in autumn in the axils of the leaves of the current year's growth. Clustered round the main buds are a number of small accessory buds; these give rise to the secondary inflorescences which are characteristic of this species and of the two following. It may be noted, moreover, that some of the primary inflorescence buds are not sessile in the axils but are borne on a short stem, consisting usually of a single node and internode, up to 1 inch in length. The inflorescence in spring may therefore be either sessile or borne on extremely short lateral shoots of the previous year. In our English climate many of these very short shoots are killed during winter and the flowers arise exclusively from the sessile buds or from the accessory inflorescence buds. (See Tab. B.)

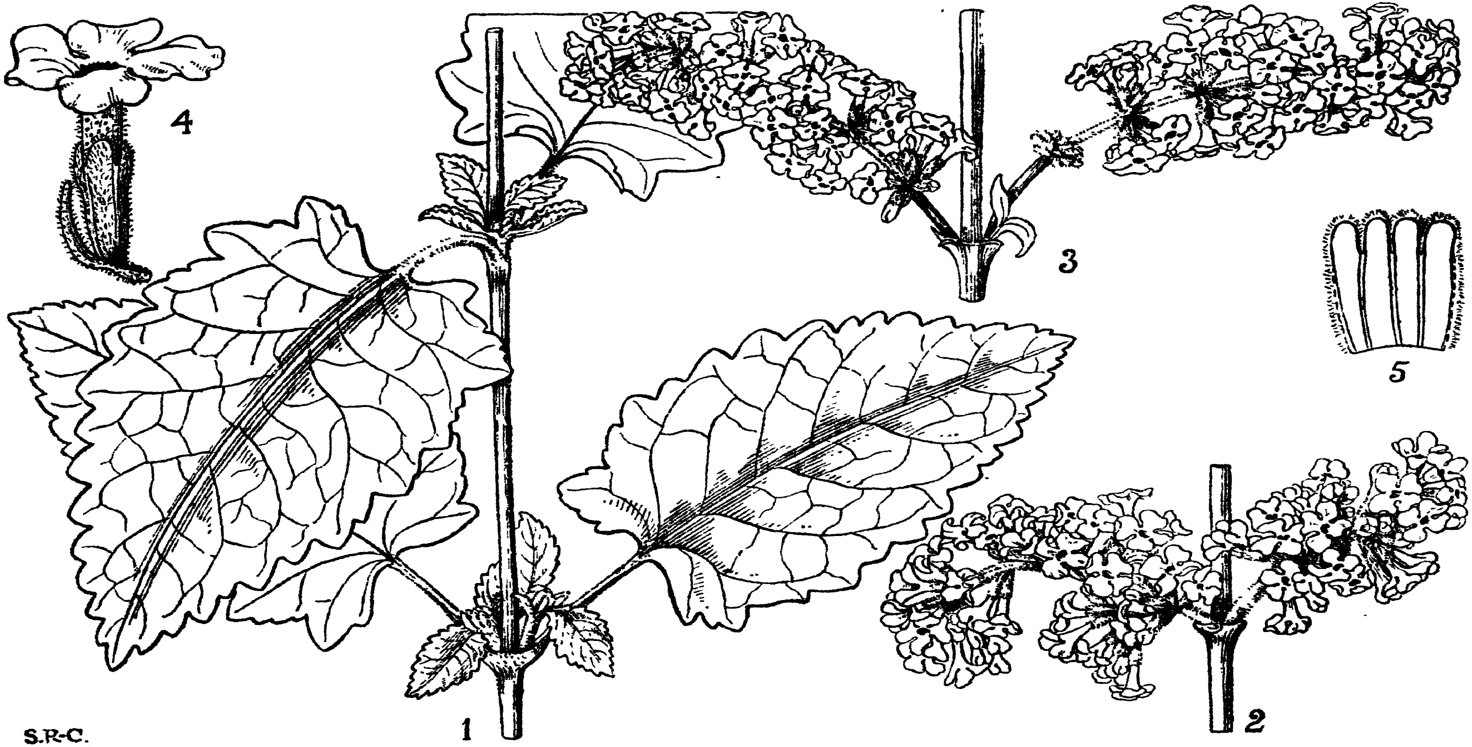
B. Farreri shows a feature which is found also in *B. tibetica*, namely, that the strong shoots which arise from the base are somewhat different in character from the ordinary shoots, namely in the leaves having very large stipules and in the petiole being broadly winged. This feature has not always been appreciated by botanists working with dried material and has led to some erroneous conclusions.

B. STERNIANA

Though introduced to this country over twenty years ago, *Buddleia Sterniana* was only described recently (see COTTON, *Gard. Chron.*, May 3, 1947, p. 159). Its origin is uncertain, but the plant was grown from seeds collected by FORREST, which were distributed by the late REGINALD CORY in 1922. It is therefore a Chinese species and is probably a native of Yunnan.

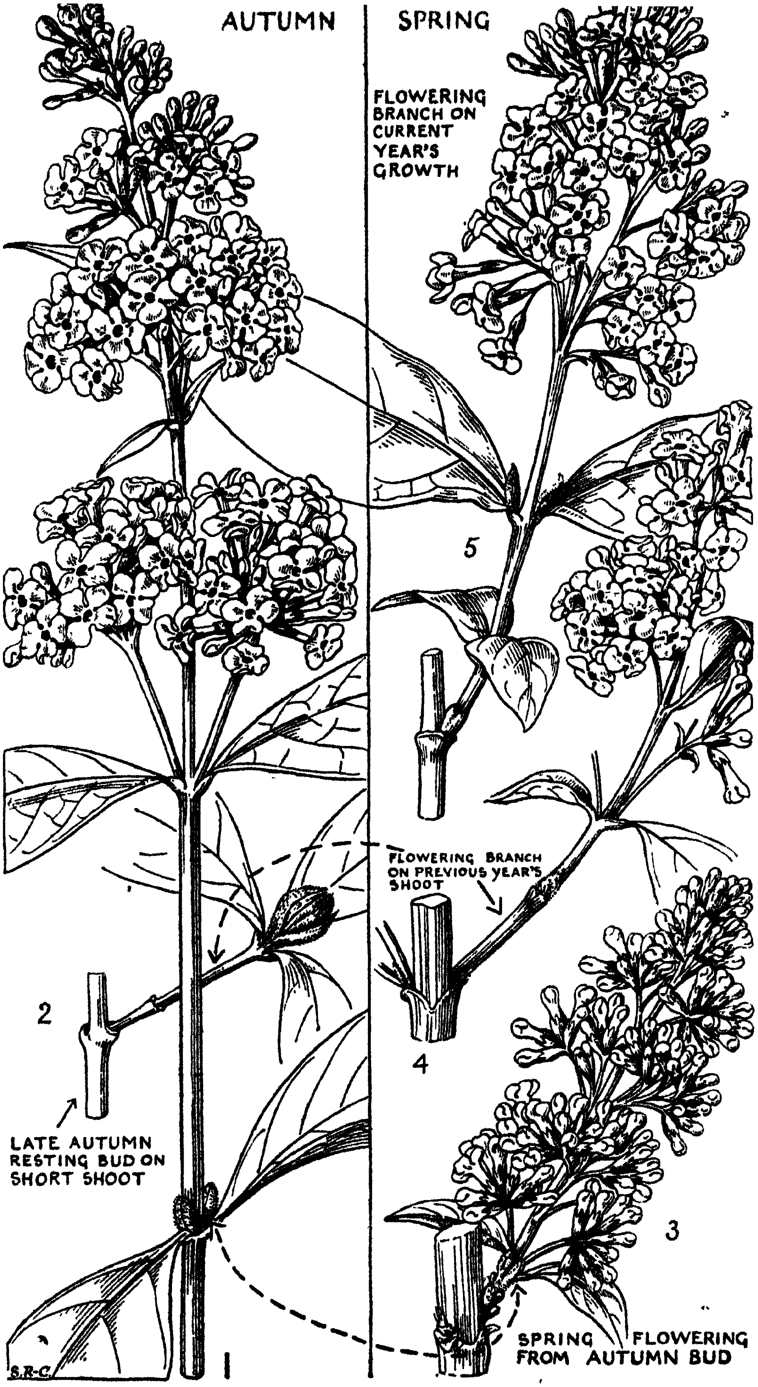
Two good specimens were for many years in cultivation at Edinburgh under the name *B. caryopteridifolia*, and the species may exist elsewhere, but the only mature specimen known to-day is one in Col. STERN's garden which has been kept under observation for several years.

B. Sterniana is allied both to *B. tibetica* and *B. Farreri*, but may be distinguished from both by its more slender shoots and more branched habit as well as by its much smaller leaves and different types of inflorescence.



Tab. C—*B. Sternana*

1. Resting inflorescence buds in autumn. 2 and 3. Leafless shoots in spring showing (2) flowers arising from sessile resting bud and (3) from resting buds on short stems 4 glandular corolla tube (× 3). 5. Calyx split open (× 3) (See p. 432)


AUTUMN
SPRING
FLOWERING BRANCH ON CURRENT YEAR'S GROWTH
5
FLOWERING BRANCH ON PREVIOUS YEAR'S SHOOT
4
2
LATE AUTUMN RESTING BUD ON SHORT SHOOT
3
SPRING FLOWERING FROM AUTUMN BUD
1
S.R-C.

TAB. D—*B. heliophila*

1. Autumn flowering shoot with two sessile resting buds which produce flowers in spring as shown in sketch 3. 4. Spring flowers produced from terminal resting bud as shown in sketch 2. 5. Summer flowers (June) borne on leafy shoots produced from ordinary vegetative lateral bud (See p. 435)

As a garden plant its slender shoots and neat foliage, white on the underside, make it an elegant shrub, but the growth is apt to become straggly unless well cut back after flowering. It flowers profusely towards the end of April on the previous season's wood, though it is not a showy species, as the flower-heads are small and of a very pale lavender colour. The individual flowers are, however, striking owing to the presence of a large orange eye which contrasts pleasingly with the pale lavender lobes of the corolla. Resting flower-buds form in autumn in the same way as in the two previous species. (Further details will be found in the *Gardeners' Chronicle*.) (Tab. C.)

B. HELIOPHILA

This little-known species, which is not closely related to the last three, begins to flower towards the end of May and continues until well into June, and may bloom again in autumn. It was discovered by FORREST on the Tali Range at 7,000–8,000 feet in July 1910, and was described as a new species by Sir WILLIAM WRIGHT SMITH in 1913. Plants were raised by the late J. C. WILLIAMS of Caerhays Castle, and probably also in a few other gardens though these are now not easy to trace. A large specimen exists in Mr. G. H. JOHNSTONE'S garden at Trewithen and another in Mr. CHARLES ELEY'S garden at East Bergholt, from which he has raised young plants. Cuttings were sent by Mr. ELEY to Kew, and these were rooted successfully by the sand-frame method.

From the garden standpoint *B. heliophila* is not a particularly striking species, but its remarkable resting buds, referred to later, and the variety of ways in which the flowers are borne may interest the gardener as well as the botanist, and as the plant has never been kept under continuous observation there is scope for further investigation. The leaves differ from those of the previously described species in being thin, almost glabrous and narrowly elliptic, thus resembling those of the *B. Davidii* series and other summer flowering species (Tab. D, 5). The flowers are soft rose-lilac in colour and have according to Mr. ELEY " a delicious scent resembling that of honey." The individual flowers are relatively large, the corolla being 7–8 mm. in diameter and the tube up to one centimetre long and of a deep salmon-rose colour. Cultivation has not had its frequent effect of increasing size, for wild specimens, preserved in herbaria, show even larger flowers. In 1945 two plants in Mr. ELEY'S garden commenced to flower in early September, and the autumn being a mild one, they continued until November.

The manner in which the inflorescence is borne shows unusual diversity. This was discernible in the dried Chinese specimens and has been followed out more completely at East Bergholt. In the autumn several of the main and lateral shoots terminate in flowers, the inflorescences being relatively large, up to 8 to 10 inches long (Tab. D, 1). At the same time other shoots produce small brown resting flower-buds—either terminal or lateral (Tab. D, 1 and 2). The main flowering season is in late spring, when these resting-buds unfold.

The spring flowers are either terminal on last year's shoots or axillary, the latter being sessile or borne on very short axillary shoots (Tab. D 3 and 4). Compared to the autumn blooms these early inflorescences are small, being usually about two inches long. A little later another series of flowers is produced, not from resting buds, but on ordinary lateral shoots of the current year (Tab. D 5), or occasionally springing from accessory buds at the nodes of the old branches. These inflorescences are somewhat larger. There is then a lull till the autumn, when further flowering, the amount depending probably on the season, takes place.

The most interesting feature is the presence of resting flower-buds which are much more specialized than those of the spring-flowering species previously described, and are of a type which, as far as is known, is not found in any other species of *Buddleia.* The whole inflorescence rudiment is completely enclosed by a number of small, dry, brown scales (rather similar to those of a Cherry) and it is thus much more protected than are those of *B. tibetica* or *B. Farreri.*

DISCUSSION

The distinctive feature of the spring-flowering Buddleias, which are found between 7,000 and 11,000 feet, is their sessile or almost sessile inflorescences borne at the nodes of the previous year's shoots. Most other Asiatic species of the genus are found at lower elevations and flower during summer, the principal inflorescences terminating the main shoots and the later ones terminating the long lateral shoots which grow out near the apices of the main shoots. In the spring-flowering species the main shoots do not terminate their summer growth in flowers but in resting flower-buds, and the lateral buds near the apices do not produce long shoots but form resting flower-buds which are borne either on lateral branches which remain very short, or are actually sessile in the leaf axils.

The season of flowering in the two groups of species is obviously in keeping with climatic conditions obtaining at the respective elevations, and one is tempted to speculate as to whether the resting-bud and spring-flowering habit may not have arisen as an adaptation to a colder climate and a shorter summer.

In any given area the species composing a flora are liable to extend their range, and on a mountain-side there is a tendency for many plants to advance upwards where competition with other vegetation is not so keen or is different in character. In the genus *Buddleia* such migration would be facilitated, as the seeds are light and winged and are easily wafted by air-currents. In the course of time, if the species possessed the necessary tolerance to withstand the decreasing temperature, considerable distances and altitudes might be covered. But, although the plants might be able to maintain their vegetative growth at higher levels and flower freely, the season might prove too short for the production of seed. Unless continually reinforced, therefore, by fresh seed blown up from below, the species would be unlikely to establish itself permanently.

CHOICE SHRUBS

FIG. 162.—*Rhododendron obtusum* var. *Kaempferi* 'Daimio.' (See p. 310)

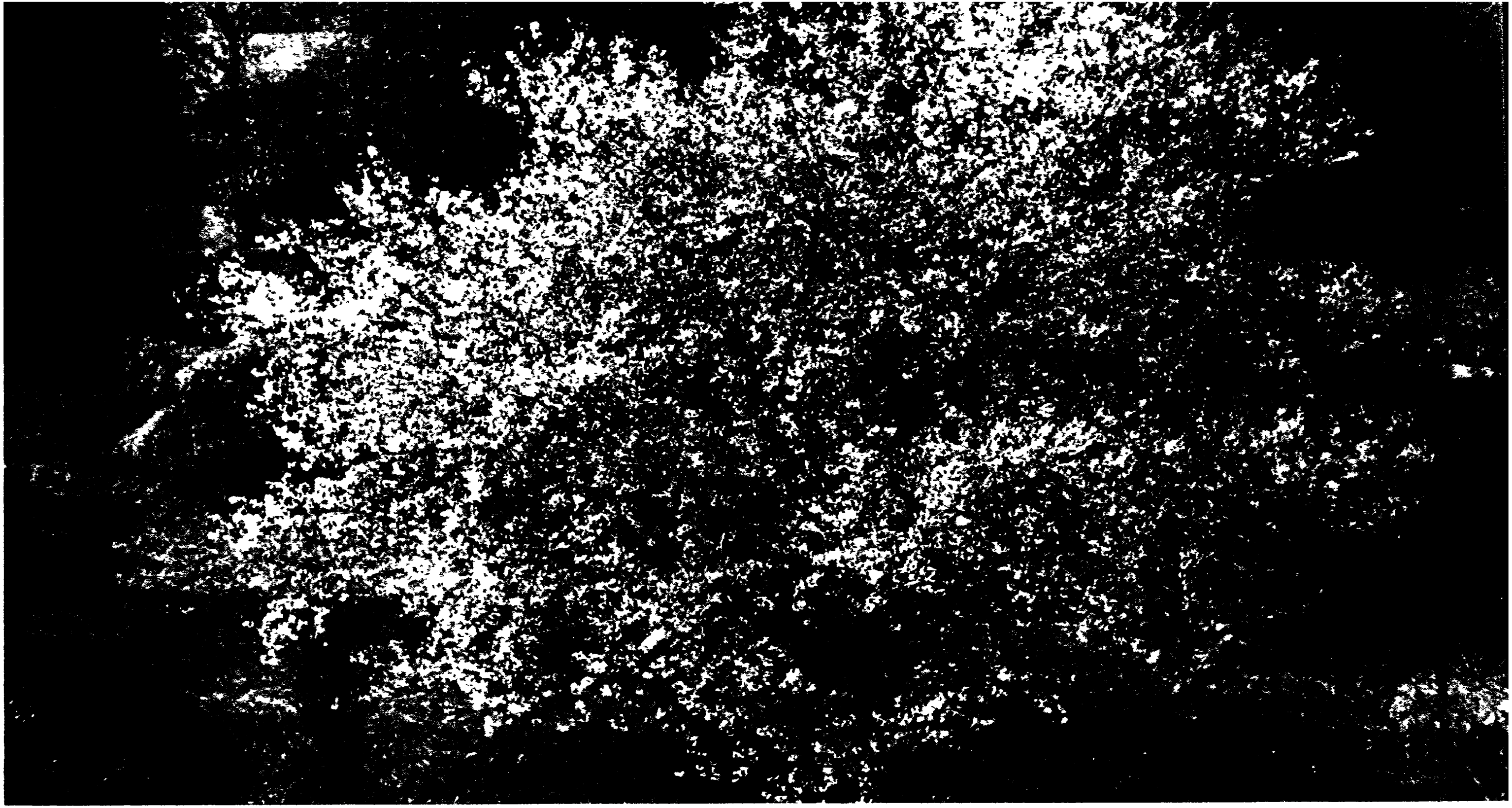
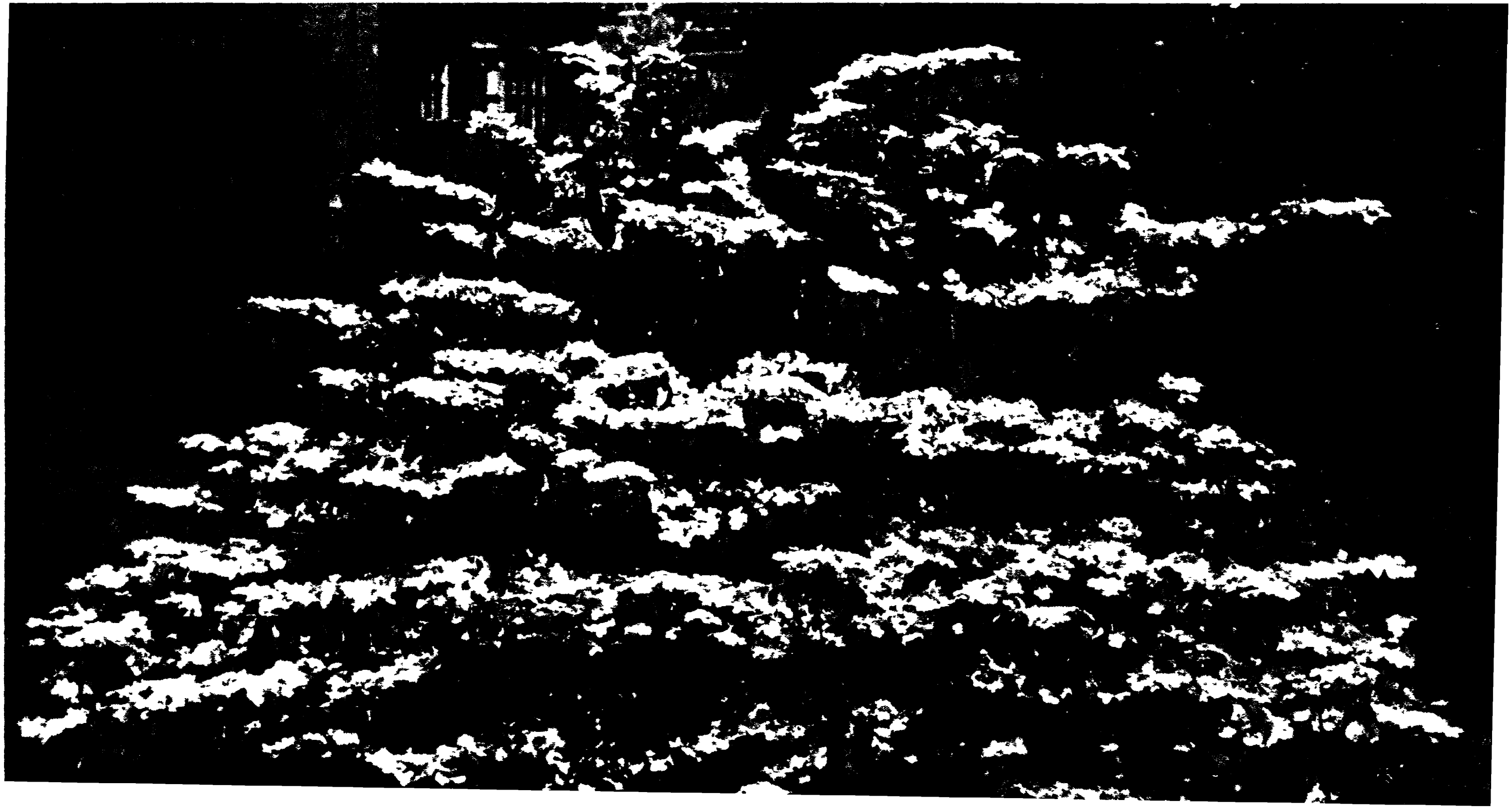


FIG. 163.—The Spring Cherry. *Prunus subhirtella*

FIG. 164—*Viburnum tomentosum* var *Mariesii* at Wakehurst (See p. 424)



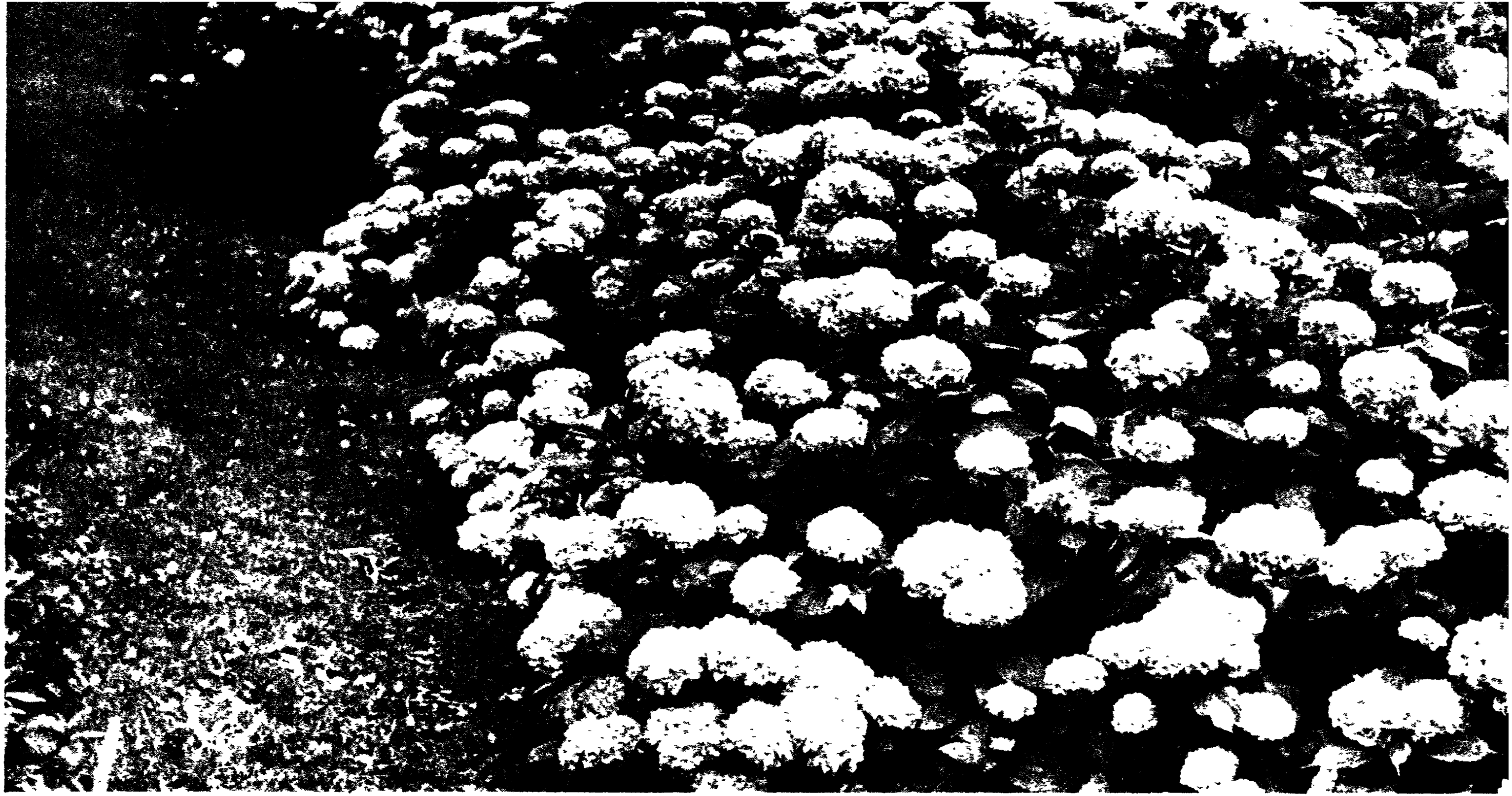
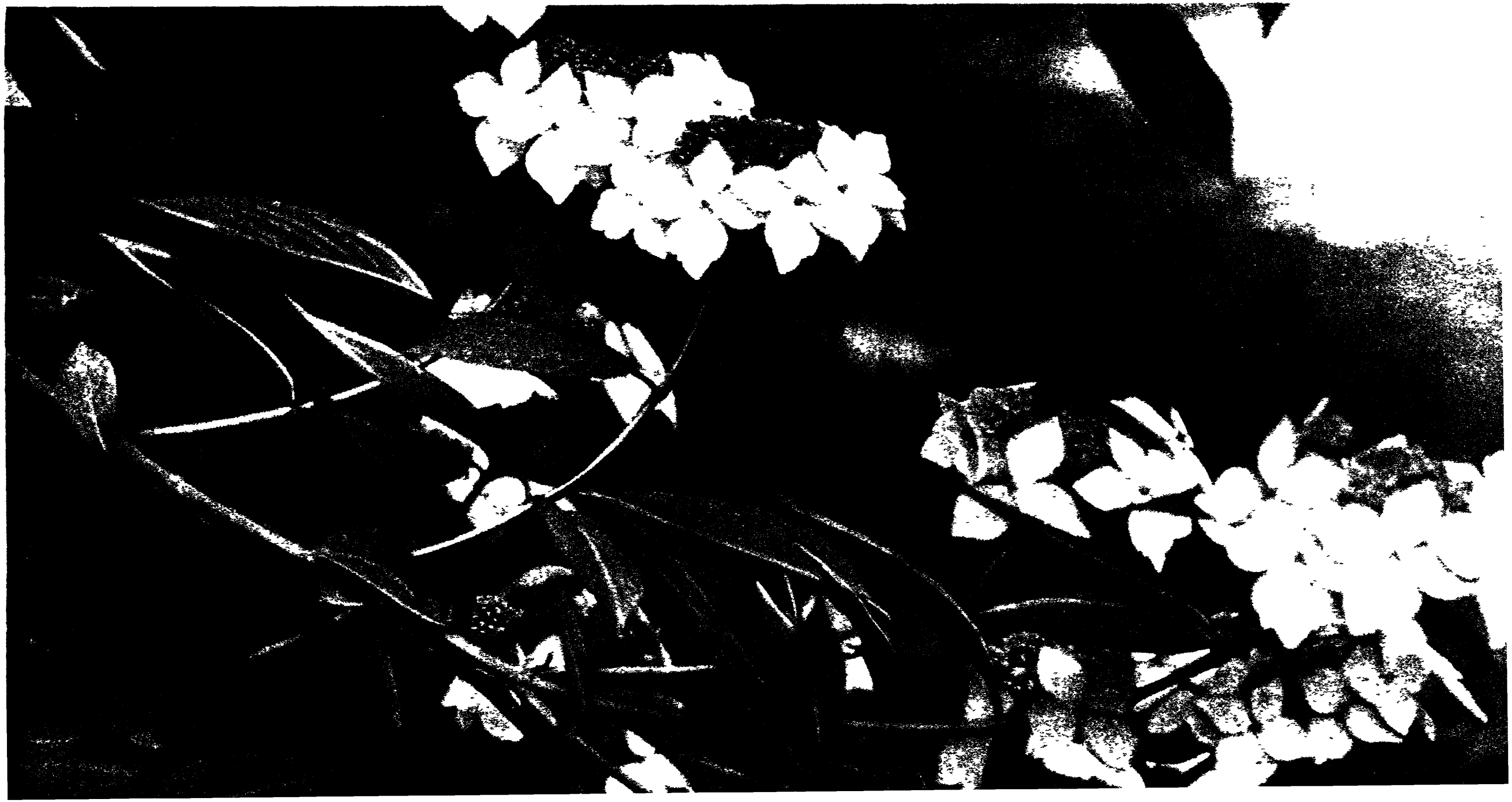


FIG. 165.—*Hydrangea macrophylla* var. 'Générale Vicomtesse de Vibraye.' (See p. 426.)

FIG. 166 *Hydrangea serrata* var. 'Grayswood.' (See p. 426)



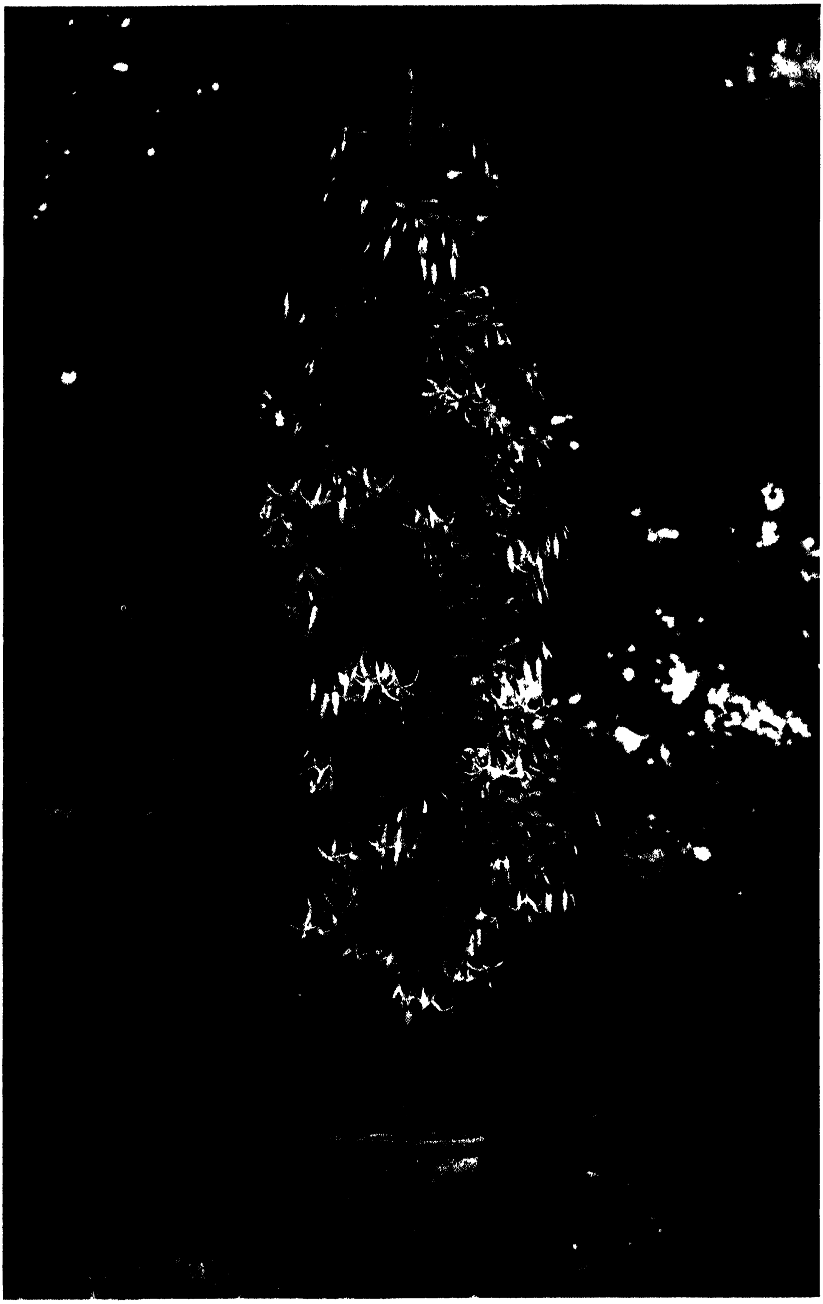


FIG. 167—*Fuchsia* ' Cascade ' (See p. 444)

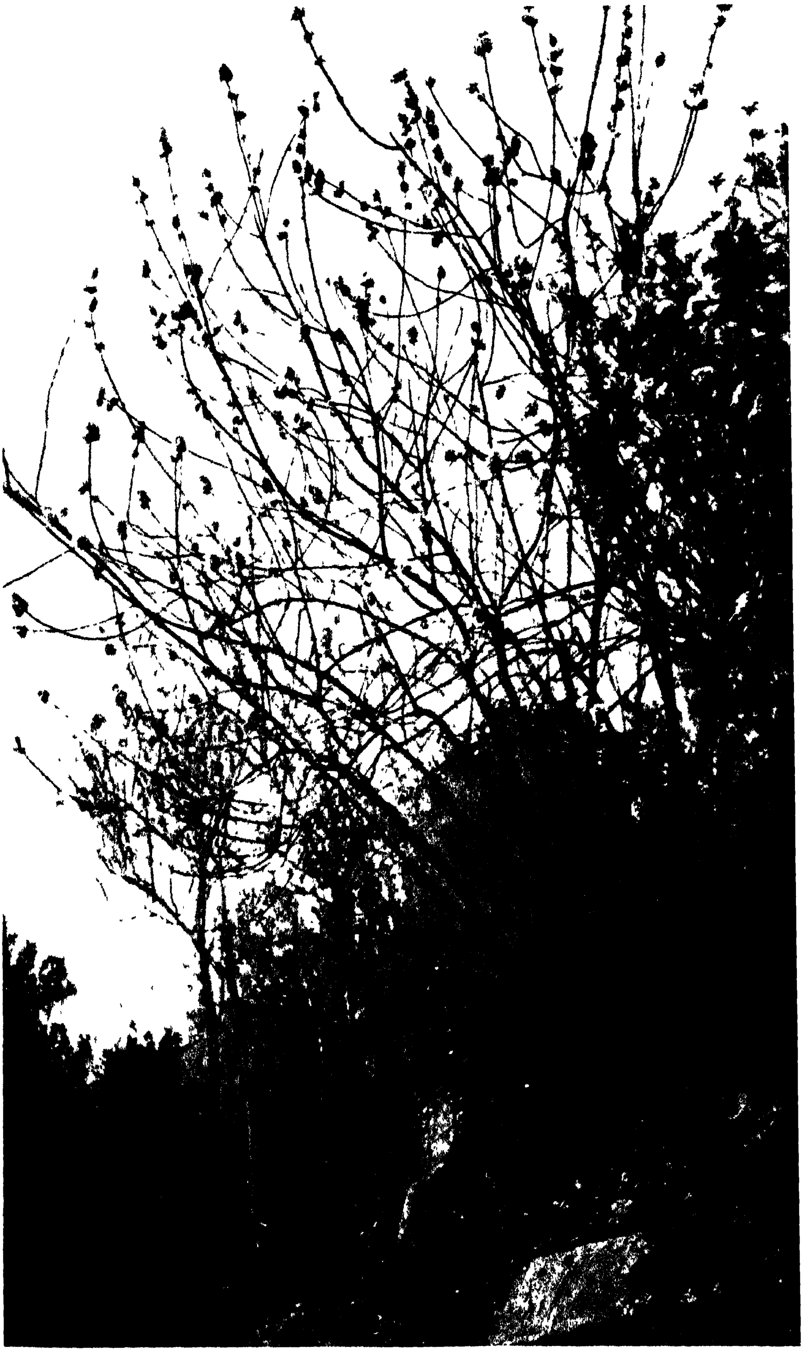


FIG. 168 –*Buddleia tibetica* in Moat Garden, Windsor Castle (See p. 430)

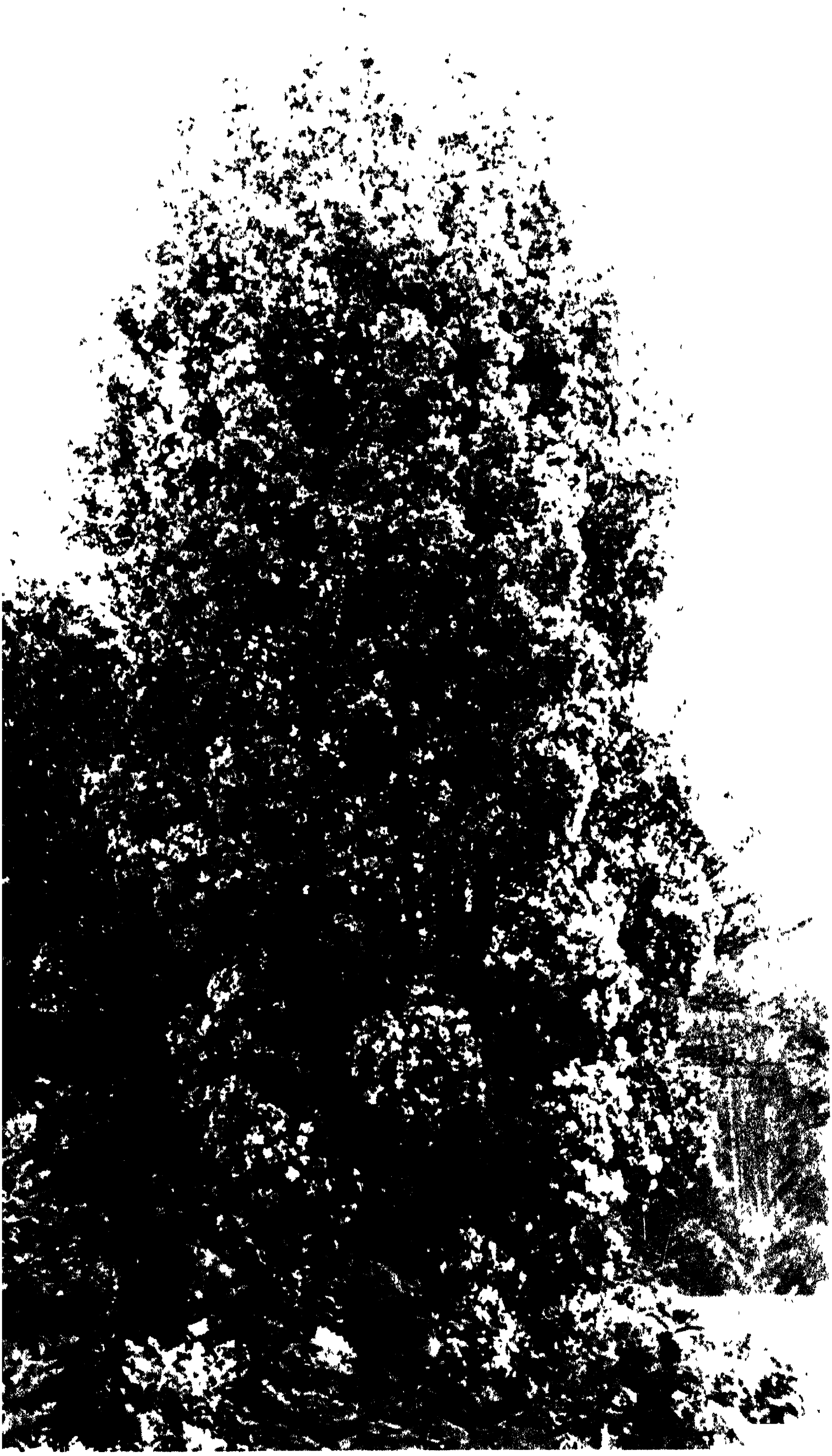


FIG. 169 *Eucryphia nymansensis* (See p 427)

But plants which had attained an unusually high altitude might be able to maintain their continued existence if a state of early dormancy set in whereby the flower-bud initials were preserved unharmed through the winter. Spring flowering would give time for the seeds to ripen. It must be admitted that Nature's way is usually a ruthless extermination of individuals which transgress the bounds of the normal environment. But adaptation to climatic conditions is known and it is possible that certain plants and shrubs may have reacted to the lower temperature and shorter duration of light in autumn by producing flower-bud initials which remain undeveloped and dormant throughout the winter.

Whether or not *B. tibetica*, *B. Farreri* and *B. Sterniana* with their dormant flower-buds unprotected by specialized scales have been derived from any summer-flowering series is not clear. They appear to form a trio which is isolated though it is possible they may be connected with the summer-flowering group by species not yet introduced or not fully understood.

B. heliophila stands in a different category, firstly in the form of the leaf which appears to ally it definitely with the summer-flowering species, secondly in its specialized and well protected resting buds which, as far as is known, are unique in the genus, and thirdly in its three-fold crop of flowers, namely spring, early summer and autumn. The spring-flowering habit is here more remarkable since it occurs in a species which in the form of its leaves and in the nature of its inflorescence is more akin to members of the summer-flowering series.

In any consideration of adaptations to climatic conditions it should not be assumed that modification is direct or that it is likely to take place apart from genetic changes. But on high mountains such changes are not improbable. There is little doubt that those small deviations from the normal, known as mutations, often occur and also that hybridity between strains of a given species and its mutations takes place. The occurrence of any new forms, whether by a series of mutants or by hybrids, would give greater opportunity for extension of range, and any individuals inheriting a tendency to a dormant flower-bud habit would be more likely to survive and multiply.

It is a familiar fact, moreover, that doubling of the chromosomes, or polyploidy, is particularly liable to occur under conditions of extreme cold, and that polyploidy is frequently responsible for the production of new races. Polyploid plants often possess a wide range of tolerance and are noted for their vitality and persistence under adverse conditions. As it was possible that the number of chromosomes might throw light on the origin of the spring-flowering Buddleias, specimens were sent to Dr. JANAKI AMMAL, an expert cytologist working at Kew, in order to examine the pollen mother-cells of the anthers. Those of *B. heliophila* have not yet been tested, but the number of chromosomes of the other three species proves to be the normal diploid number for the genus (36). Changes brought about by polyploidy cannot therefore be considered as being directly concerned in the origin of *B. tibetica*, *B. Farreri* or *B. Sterniana*.

The illustrations accompanying this article have been drawn by S. Ross-Craig.

FUCHSIAS

By W. P. Wood

(*Lecture given on July* 29, 1947 : The Hon. LEWIS PALMER *in the Chair.*)

IN this paper I want to " sell you Fuchsias," figuratively of course, and I hope to succeed in interesting you in these lovely plants, either as a beginner or to extend your cultivation—for more and more people are being captivated with their quiet charm.

As you all know Fuchsias were extensively grown at the end of the last century, but largely went out of cultivation, but I need hardly remind you that fashions in plants—as in ladies' hats—have a habit of repeating themselves.

I think there were several reasons for this decline in their growth :

1. Perhaps the great increase in the number of new plants introduced, and here if you will allow me to misquote Kipling—

" God gave men all plants of the earth to love, but since our hearts are small, ordained that one plant should be beloved over all others " ;

2. The general decrease of the number of ornamental plants grown in greenhouses over the last 30 years ;

3. The great increase of the white fly pest ; and

4. One of the chief reasons, it became known as a " Victorian plant," and in all too many cases that was the worst possible condemnation. But, strangely enough, some Victorian art is coming in again. I saw some at Chelsea—but of course it was not labelled as such ! But lots of people were admiring it.

Let me just mention a few of the good points in the Fuchsia's favour. Its ease of growth, and under generally sensible methods of cultivation, how trouble free and practically pest free it is. How much hardier it is than is generally supposed. Its continuity of flowers over a very long period. Its quiet but lovely colouring, from white through cream, yellow, pink-orange shades, reds to carmines, mauves, violets and purples, in the loveliest of variations and combinations of colours. Its quiet dignity—it has none of the blatant brassiness of all too many modern flowers which are best viewed in a car travelling, say at least, 60 miles per hour. With the Fuchsia you have got to stand and look at it to appreciate its full beauty, and after all :—

" What is life if full of care,
We have no time to stand and stare."

Here I propose to treat of its cultivation from the point of view of those who have little or none of the facilities generally considered necessary. On a number of occasions when people have been admiring Fuchsias, I ask why they don't grow some themselves. The usual reply is " I have no greenhouse." Well I have no greenhouse, no artificial heat of any sort—just cold frames, but I manage to grow something over 100 varieties, to hybridize and raise new varieties from seed and in addition they have to take care of themselves all day.

Let me emphasize that they are hardier than is often supposed.

Their natural habitat extends from Mexico on down through Central and South America, in the tropical forests, in the Andes, and along the coastal plain down to the Straits of Magellan ; there are also three species in New Zealand. But all the varieties grown are descended from the American species, and it is largely from the use of *Fuchsia magellanica* that hardiness or near hardiness has been achieved. Heat, however, is necessary for the Triphylla section.

So successful has their hybridizing been that to-day Fuchsias can be obtained for almost any purpose in the garden or house. As a permanent occupant in collections of choice shrubs, it will be in no way outrivalled by its neighbours, for wet or fine, it will go on flowering ; suitable varieties make excellent plants for the rock garden ; as summer furnishing for flower beds ; for window boxes, in hanging baskets for a number of positions ; as large bushes in tubs around the house or forecourt ; in the conservatory or in the house itself. Some enthusiasts even have Fuchsia gardens.

Fuchsias can be grown in a very great variety of sizes and forms, creeping plants to large bushes 10 or 12 feet high, or in favoured parts of the country, notably the West of England and Scotland, as trees up to 20 feet or more high.* In the greenhouse they can also be grown as pyramids, standards, cordons or even as semi-climbing plants.

CULTIVATION

Having outlined a few of the possible uses to which it can be put, I would now like to give you a few particulars of its very easy culture, and the method which I myself use, with, as I said before, the most elementary facilities, and no artificial heat of any kind.

About mid-April, it depends on the season, the cuttings are taken. I get shallow boxes and fill with sharp sand. I prefer boxes to pots as they do not dry out so quickly and there are not the extremes of moisture and dryness one is apt to get with pots. The sand is given a good soaking of water. The cuttings are taken in the usual way—growths of the current season about 1 inch long, or even less with some varieties, trimmed below a node and inserted just clear of each other. When all the cuttings are in, another good watering is given, and the box of cuttings is then stood inside a larger and deeper box ; glass is placed over the top, and the whole placed in a frame ; if I have no room then they stand outside, with some protection at night. Shading is necessary during the day, but don't put a dense shade on. I find small branches of yew or some similar material answers well, it just intercepts the sun's direct rays but does not keep out too much light. The glass is turned at least once a day and a watch kept for water requirements. Advice about watering is always difficult, but keep the sand wet without permanent saturation, as too much water will sour it, while on the other hand too little will delay root action, if not retard it altogether. The Fuchsia is an easy plant to root and anything between a 95 per cent. to 100 per cent. strike should be obtained.

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* Strangely these two extremes are both New Zealand species, viz. *F. procumbens* and *F. excorticata*.

Rooting will take approximately three weeks, more or less, depending on the general warmth—if one has a propagating frame with bottom heat, a week or even less. When rooted the glass is taken off for a couple of days and they are then potted off into 2- or 3-inch pots depending on the variety. If by chance there are any laggards these are put back into the sand for a few more days. The potting mixture is about 1½ parts of good loam, 1 part well decayed leaves or peat moss with ½ part bonfire ash—I am not very keen on sand in most composts.

When potted they are stood in the frame and a good watering is given; the frame is kept closed and shaded during the day, but not heavy shade. After a few days gradually give more ventilation and it is a good idea to fumigate the frame; in fact do it periodically while the plants remain there.

Watering will want doing with reasonable care and only the dry plants should get a drink, but the whole lot can be gently sprayed each day, unless the weather is dull and cold. When growing freely take the tip out of each plant, unless it is desired to grow them on as standards or cordons.

With the roots running freely around the pot a shift can be made into 4- or 5-inch pots, again depending on the vigour of the plant, and shortly after, if desired, the plants can be stood outdoors, plunging the pots about half their depth in soil or ashes, the latter for preference, naturally giving each plant sufficient room to develop, and it is surprising how large they will grow if treated properly. Most varieties will require a neat stake and the growths looped up as they grow. Feeding must be attended to if we want our plants to develop properly. *Do not* feed before there are plenty of roots, and then little and often, say half a teaspoonful once a week.

FEEDING

A few words on this important subject. Any good proprietary fertiliser can be used, most people have their particular fancy, but it must be well balanced. Some of them seem to develop too much foliage at the expense of bloom, while on the other hand there must be plenty of growth or there can be little bloom. Choose one with a reasonable amount of phosphate and potash. Quite a good mixture can be made, providing it is well mixed, the standard 3 : 1 : 1, that is 3 parts by weight of superphosphate, 1 part sulphate of potash, and 1 part sulphate of ammonia. If the sulphate of potash cannot be obtained I think I would rely on a proprietary brand as other forms of potash are rather dangerous in pots. Well diluted soot water, poultry, cow or sheep manure, if they can be obtained, are all good, using these latter once a week in addition to the inorganic fertilizers; but again one word of warning, do not feed until there are plenty of roots. Dried blood is useful occasionally, as also is burnt bone phosphate. In short, ring the changes and do not concentrate on one unless compelled. As stated before, give about half a teaspoonful once a week to a 5-inch pot with other sizes in proportion, watering it in.

It is a rather amusing point that growers will rarely admit that they give any feeding, or perhaps grudgingly admit to "just occasionally," but well developed and floriferous plants cannot be obtained in pots without it, so it is worth a little experimenting.

CHOICE OF SITE

When standing plants outdoors I give them all the sun they can get, for while they will grow and flower in a certain amount of shade, they are certainly better in full light. In a greenhouse one must give some shade, but not outdoors.

WINTER QUARTERS

It may have been noticed that we have got our plants into 5-inch pots; unless we want really large plants and have the facilities, that is as far as we can get the first season. With the approach of autumn and the first frost we shall have to make preparation for wintering our plants. This is quite simple: the plants are stood in the frame, as close together as possible, soil or weathered ashes are placed between them and two or three inches up the stems, no pruning is done at this season—it is often fatal; the spring is much the best time to prune.

When severe frosts are expected I get as many beech or similar leaves as I can and the plants are covered, in fact the frames are filled right up. The lights are drawn on and blocked up each end about half an inch high to allow a certain amount of air through all the winter.

If by chance the frame is not deep enough for the plants a certain amount of evacuation is done, until the required height is obtained.*

SPRING

As soon as milder weather comes, in a normal season, March, all plants are taken out, the leaves and soil cleared out. The plants are pruned, placed back in the frame, fumigated, and the frame kept closed, with watering as needed, also syringing. When growth commences, more air is given, and the plants are repotted. As much of the old soil as possible is removed without damaging the roots, and they are placed back into clean pots of the same size or even smaller ones. After this new roots will soon be formed.

From then on the treatment is much the same as for the first season, except that now we have much larger plants to start with and so, as they are needed, they are placed into pots of gradually increasing size, and they should make comparatively large plants by the end of the season.

TRAINING

A few words about the different methods of training. The normal bush plant needs little beyond an occasional pinching to induce a more bushy habit, some varieties needing more than others; anyhow, twice or three times during the season should be sufficient.

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* If, as is often the case, there is not sufficient space in the frames, I plunge the pots deeply outdoors, closely together. Wire netting is placed around the whole lot, and, of course, staked to keep it upright. The whole is then filled with leaves. About 50 odd plants which were so served last winter came through with no losses at all; but I would not recommend it for the more delicate varieties.

Should you desire something more ambitious, say a pyramid, a lot more care must be given. Briefly, at the first stop from the cutting stage, and the usual two or four breaks, select the strongest and tie it to a neat stick, and then when the side growths have made two or three pairs of leaves pinch them; when these break, stop the leading growth and again choose the strongest for a new leader, and so on, alternately stopping the side growths and the leader, and re-selecting a new leader, always remembering that the ideal is to obtain a plant which will resemble a cone standing on its base, and furnished with branches of varying length from top to bottom. Also, once a start has been made to pinch, all the side growths should be done simultaneously.

With care, and the facilities, plants up to 12 or 15 feet high can be obtained, but I must admit that such heights of cultivation are difficult to obtain, but such plants are a wonderful sight.

Standards are much simpler to build up. Choose a good strong cutting and keep it growing, without stopping, until the required height is reached, when the top is taken out. All side growths should be removed except the top three or four pairs which will form the head. They, of course, must be pinched several times until a head of sufficient size is obtained. Some growers allow the side shoots to form all up the stem, but keep them short—they claim it strengthens the main stem; personally I prefer the first method.

Perhaps here I should explain that " stopping " and " pinching " mean the same thing, namely, the growing point is taken out to induce a bushy habit of growth.

A slight modification of the standard building up will make a cordon. Again allow a stem to grow straight up, but in this case all side breaks are pinched back to the first pair of leaves and all subsequent growth pinched back to a pair of leaves; when the desired height is reached the top is stopped and from then on all growths are allowed to continue naturally and so, of course, flowering all up the main stem. When spring pruning is done all growths are cut back to within a few inches of the main stem.

Baskets make most attractive furnishing for greenhouses, porch, verandas or similar positions. Galvanized wire baskets of, say, 15 inch diameter are lined with a fairly thick coating of moss, some soil is placed on the base and three or four plants are arranged around inside, the whole is then filled up with soil and made firm. Make sure to leave a saucer-like cavity at the top to hold water. Basket plants need quite a lot more water than plants in pots, also feeding, and they appreciate quite a bit of syringing. Anyone who has been to Kew in the summer will remember the wonderful baskets they produce there, triumphs of cultivation.

With baskets a fresh start should be made each season, also with varieties of fairly pendent habit.

Greenhouse climbers, or rather plants to furnish the rafters of greenhouses, are like an extension of the standard, a main stem is run up;

at the required height the plant is stopped and selected growths are trained over the greenhouse roof; these plants are often permanently planted in side borders. In the spring they are spurred back and the new growth again trained. This is an ideal method of seeing the flowers, suspended overhead.

OUTDOOR CULTIVATION

This is the simplest; procure good strong plants in pots in early June, or when danger of frost is over. The purpose of planting then is to give them a good chance to get established before winter, also pot plants are much the best; outdoor established Fuchsias do not move well, and it usually takes them several seasons to get properly going again. So unless it is a really old favourite always start off with pot plants.

Any good garden soil suits them, they are of the least fussy in that respect. Aspect should be open, south or west, the main point against an easterly position is the danger of late spring frosts; although I have had some excellent results facing east, the plants were protected by a distant belt of trees from getting the first rays of the sun. Naturally they would not be planted in ground full of tree roots.

The first season it will be necessary to give a certain amount of water, but afterwards they will take care of themselves.

It is also advisable to place a few inches of soil over and around the root area for the first two winters. If they should be cut to the ground, by frost, they will speedily spring up again and flower all summer, a delight to all.

VARIETIES

Now varieties for various purposes. I do not propose to give you a long list; it has been estimated that there are over 2,000 of them, while in addition there are about 100 different species; certainly they are not all in cultivation, and it is doubtful if all the species ever have been. While on the subject of species, has anyone got *Fuchsia venusta*? I would be grateful if I could be put in touch with it.

First the rock garden. I expect the purists will hold up their hands in horror, but after all a lot of Fuchias come from the mountains, which cannot be said of all plants in a rock garden, also none of the following are of the so-called 'florist' types. *F. magellanica pumila*, a charming little plant, dense bushes, rarely more than a foot high and covered with red and purple flowers. 'Venus Victrix,' white and mauve, a very old variety and raised in 1842; this is said to be the original parent of all white tubed varieties.

'David,' this has the colouring of *pumila*, a similar but better habit of growth than 'Venus Victrix,' while the shape of the flowers resembles the latter; it is, in fact, a cross between these two.

'Lottie Hobby,' one of the Brevæflore type, thin, wiry and graceful stems, bearing masses of tiny crimson flowers, not looking at all like a Fuchsia; these are followed by small black berries. *F. procumbens*, a creeping species from New Zealand, again thin wiry stems which grow along the ground several feet during the season, the flowers which sit straight up—they are not pendant—are yellow, tipped purple, with the most lovely blue stamens, and they really are blue; the flowers are followed by comparatively large red berries.

For the shrub border the following: *F. magellanica alba*, not a pure white, more skim-milk colour with very faintly tinged pink corolla, must not be treated too generously, grows up to 5–6 feet high.

F. × 'Thomsonii,' after the style of *gracilis*, but stiffer and dwarfer, 3–4 feet high, red and mauve, makes a good hedge. *F. magellanica gracilis variegata*, a really lovely shrub, growing 5–6 feet high, tips of branches pink, rose and silver, with older leaves plain silver, red and purple flowers; give this all the sun possible to bring out its full colouring. 'Mme. Cornelissen,' scarlet and white, free and showy 4–5 feet high.

'Caledonia,' long reddish cerise, with reddish violet corolla, exceptionally free, rather pendant habit 3–4 feet high.

Among a few of newer varieties of my own, I would like to mention 'Kathleen,' dwarf, very free, pale cherry-red tipped yellow, with chrysanthemum crimson corolla. 'Margaret,' carmine sepals, purple-veined scarlet corolla, one of the largest-sized flowers in the hardy varieties, vigorous 5–6 feet high, and very free when established. 'Glow,' cerise sepals, with wine suffused scarlet corolla 3–4 feet, free and showy. 'Mrs. W. P. Wood,' pale green foliage, at least 5 feet high, pale flesh-pink tube and sepals, with pure white corolla, at least twice the size of *F. megallanica alba* from which it is a second generation cross. This has attracted quite a lot of attention.

For baskets here are some excellent varieties of which some are quite distinct from each other, if only one is grown I commend the use of 'Cascade' (Fig. 167). Other Fuchsia varieties which are suitable for hanging baskets include 'Muriel,' 'Balkon,' 'Wave of Life' (golden foliage), 'Mrs. Marshall,' 'Marinka,' 'Lena,' 'Caledonica,' 'The Doctor' (synonym 'Mrs. H. Roberts'), 'Rose Pearl,' 'Coreen,' 'Evelyn Little.' While as for varieties for pot culture, a glance through the various Nurserymen's lists, who specialize in Fuchsias with their hundreds of varieties should suit all tastes, inclinations and pockets, and talking of pockets there are not many plants of which one can purchase 20 different sorts for £1.

PESTS

These are, fortunately, few and fairly easily disposed of. In the first place I know of no fungoid or bacteriological trouble that attacks Fuchsias. Under glass, and occasionally outdoors, white-fly is a nuisance. D.D.T. seems about the best cure here, sprayed under the leaves. Capsid bug of various sorts can be a nuisance outside, but periodically spraying with a nicotine wash in the spring, and again in late summer will usually dispose of them. If shoots have their tips distorted and going "blind," capsid should be suspected. The ubiquitous green-fly should be constantly watched for, especially indoors, but periodically fumigating with a nicotine preparation will keep them well in check.

My worst pest are Bees! Both the hive-bee and the humble-bee as they ruin every flower they touch. I think some of my neighbours must have Fuchsia honey, instead of Heather honey.

HYBRIDIZING

A few words on hybridizing may be of interest. It is quite a fascinating subject once a start has been made. In the first place one must have some particular object in view; odd spasmodic efforts will only lead to disappointment.

My own personal interest has been to extend the colour range in the hardy varieties, and also to improve the size of the blooms; and while the colour range has been fairly well extended, in only a few cases has the flower size, 'Margaret' being the outstanding variety in that respect, although in 'Jewel,' 'Glow,' 'Admiration' and 'Immaculate' quite an improvement has been made.

Naturally, one of the parents must be hardy, or even of outstanding hardiness; a good deal of trial and error goes to finding the other parent, quite a few seem incompatible apparently, and not necessarily does the largest seed pod contain most seeds, in fact some of them are so disappointing as to produce no seeds, but that all adds to the interest.

I have used, among others, *Riccartonii*, *pumila*, 'Caledonia' and *alba* as seed parents. 'Caledonia' gave me a plant which has proved of value as a seed parent, while from *Riccartonii* results have been disappointing, several interesting plants, but nothing of value. As pollen parents quite a number have been used, all from some distinctive point as habit or colour and always for their freedom of flowering.

The principles of hybridising are well known, but I would like to stress the point of covering the seed-bearing flower with muslin or a cellophane bag to keep foreign pollen off, and also to protect the seed pod from birds.

I choose a bud which would naturally be open in a short time, open it artificially, remove the stamens, and apply the chosen pollen straight away. If care is taken to choose buds at the right stage, fertilization usually takes place, but as I said before, there are the seeming incompatibles, and when one remembers that chromosome numbers in Fuchsias vary from 22 to 88 that is hardly surprising, and the chance of incompatibles fairly high.

I have given up using reds and purples as pollen parents as one usually gets them without trying.

As soon as the seed pod is ripe it is stored intact, with its appropriate label until the spring, in a cool dry place. If one is fortunate enough to have heat the seed can be sown straight away, and the plants gently grown on all winter; a whole season can be saved by this method. If not the seed is sown in April and placed in a cold frame.

A good soil is 2 parts turfy loam well broken up, but the fibres retained, 1½ parts peat moss or well decayed beech or oak leaves, with

½ part finely crushed crock dust, and perhaps a dash of silver sand on the top when the seeds are shown.

The young plants should be transferred to boxes as soon as possible, the seed is apt to be a bit erratic in germinating, so do not throw the seed pans away, and watch them for the late comers.

When growing freely pot off into 2- or 3-inch pots and treat as for cuttings, but do not stop or pinch them, try to get as vigorous a plant as possible the first year for over-wintering. A few may flower the first season, but not many, our summers are usually too short.

Once a start has been made, one has, each season, something to look forward to—even if it is only escorting the rubbish to the bonfire !

THE MAIDENHAIR TREE (*Ginkgo biloba*)

By H. Prideaux-Brune

AFTER having seen the trees of every country in Europe, of nearly all the States of North America, of Canada, Japan, China, West Siberia and Chile, we confidently assert that these islands contain a greater number of fine trees from the temperate regions of the world, than any other country." (ELWES and HENRY, *The Trees of Great Britain and Ireland*, Introduction.) This is a stimulating observation, and one calculated to encourage all those who care for the preservation of the woodland scenery of this country and its great and various heritage of trees.

Among the more uncommon species which are described in ELWES and HENRY's great work, a peculiar interest attaches to the *Ginkgo biloba*, or Maidenhair Tree, a splendid forest tree of which the first specimen was brought to Europe from the Far East a little over 200 years ago.

Some readers may perhaps remember that this tree was the subject of a discussion in the correspondence columns of *The Times* in March 1936, which aroused much interest. A number of letters were written to the paper calling attention to the *Ginkgo's* exceptional history and citing notable specimens which are in existence in this and other European countries. The *Ginkgo* has, in fact, several attributes which combine to invest it with a special fascination : its fine stature and the peculiar beauty of its leaves, the veneration in which it has been held for centuries past in China and Japan, and, above all, its history, which gives it a unique place in the plant-life of the world.

Specimens are now growing in a number of gardens and public parks in several countries of Europe ; but the tree is still unusual enough on this side of the world to be cherished as a special possession. The Gosport Corporation have recently accepted a gift of ten *Ginkgo* for their Bridgemary Housing Estate, in the parish of Rowner. The tree-planting scheme is a special and carefully planned feature of this housing estate, which is designed throughout on the most complete and up-to-date lines, to meet the needs of a new residential centre on the borderland between the town and the country. It was felt that the presence of a few *Ginkgo* would form a small additional element of variety, amid the flowering avenues of the new estate and the adjacent copses and grand old oaks of Rowner. These latter will, fortunately, in great part remain to make their own contribution to the dignity and distinctive character of the locality in which the new residential centre is situated.

It should be mentioned here that Gosport already possesses one *Ginkgo*—a young tree growing in the Foster Gardens, in Stoke Road. Reference will be made below to some of the well-known specimens in this and other countries, including several in Hampshire.

The fact of peculiar interest in the history of the *Ginkgo* is that it is the descendant of a family of forest trees which existed in an immensely distant past, and formed part of a vegetation which, apart from this solitary survivor, in the course of long ages declined and eventually vanished from the face of the earth, before the birth of the human race and before our familiar broad-leaved trees came into being. From the evidence afforded by fossil remains it has been possible to trace the fortunes of the branches of the *Ginkgo* family from age to age and in various parts of the globe. Incidentally, it is interesting to note that some of the most beautifully preserved fossil-leaves (dating from the Tertiary period) were found in the Island of Mull, off the West Coast of Scotland. It is known that the ancestors of *Ginkgo* were flourishing more than 150 million years ago, and continued to flourish through succeeding ages, each of them measured in millions of years, and at one time the *Ginkgo* family became almost world-wide in its distribution. During a later epoch in the world's evolution, when the earth's surface and the various forms of life on it were undergoing immense transformations, it disappeared except for one branch of the family which lingered on and found a lasting home in the Far East. This is the origin of our contemporary *Ginkgo*, which thus constitutes " the solitary link between the vegetation of our present age and a past so remote that it is hardly possible for the human mind to conceive it ".

On account of its amazing history, it was nick-named by DARWIN " the living fossil ". Another great authority, the late Sir ALBERT SEWARD, who claims that this tree can reasonably be regarded as one of the wonders of the world, has summed the matter up in the following eloquent words : " The Maidenhair Tree appeals to the historical soul : we see it as an emblem of changelessness, a heritage from worlds of an age too remote for our human intelligence to grasp, a tree which has in its keeping

' the secrets of the immeasurable past '."

As above-mentioned, in its survival from pre-historic ages it found a final habitat in the Far East. It was there adopted as an object of religious veneration, and it is possible that it would have passed out of existence centuries ago if it had not been preserved and carefully tended in the groves of temples and other favoured places in China and Japan. The first mention of it in Chinese literature occurs in a book on agriculture written more than a thousand years ago (eighth century A.D.).

The tree first became known to Europeans when it was discovered in Japan, in 1690, by a Dutchman named KAEMPFER. The name *Ginkgo* was given to it by KAEMPFER (in the correspondence in *The Times* in 1936 it appeared as 'Gingko,' but *Ginkgo* is the spelling recognized in botany). How KAEMPFER came to evolve this name is a question of some obscurity, but it was adopted by LINNAEUS in 1771, and *biloba* was added because in many, though not all, of the leaves the blade is divided into two symmetrical halves.

The English name 'Maidenhair Tree,' was likewise suggested by the shape of the leaves, which are fan-shaped and fan-veined and resemble those of the Maidenhair Fern. The Chinese, on the other hand, were struck by the web-shaped form of the leaves, which inspired the name 'Duck's foot tree,' a name which was current in China in the Middle Ages. A Chinese poet of the twelfth century spoke of "the gold of the duck's foot leaves," referring to the autumn colouring of the foliage.

The leaves have indeed a striking beauty both of shape and colour. In summer they form a mass of lively green, and in autumn—just before the foliage falls—there is a strange and splendid transformation, when they turn to a pure canary-yellow, which in the stillness of an autumn day has an ethereal effect, perhaps hardly to be matched by any other colour effect in nature.

In China the kernels of the seeds are eaten, and are called by the Chinese " White Fruits " (*pai kuo*—whence the common Chinese name for the tree at the present time—" White-fruit-tree," *pai kuo shu*). They have a delicate and mildly astringent flavour and form a very pleasant addition to the dessert table. They are, moreover, supposed to aid the digestion and to diminish the effects of wine-drinking. It is all the more to be regretted that the fruits do not ripen on the tree in England. In other respects the *Ginkgo* grows well in this country and we have some fine specimens, but it seems that it requires hotter summers and colder winters for its best development.

After KAEMPFER'S discovery of the *Ginkgo* in Japan in 1690 a specimen was planted in the Botanic Garden at Utrecht (about 1730). The tree was introduced into England in 1754 and into the U.S.A. in 1784. Its introduction into France in 1790 was the occasion of an amusing incident. A French amateur named PÉTIGNY asked a nurseryman in England to sell him five young trees. The nurseryman asked a very high price for them, but after PÉTIGNY had entertained him to an abundant *déjeuner*, he was induced to accept 25 guineas for the lot. The next morning, when the effects of the *déjeuner* had worn off, he repented of this bargain, and offered PÉTIGNY 25 guineas for one of the five plants. PÉTIGNY refused, and took all five back with him to France. The price he had paid worked out to the equivalent, in the French money of that day, of 120 francs, or 40 crowns (*quarante écus*). This is the origin of a name by which the tree is known in France—*Quarante Écus*, which still sometimes figures in French catalogues.

Of specimens which are now growing in gardens and public parks in Europe, one in the Botanic Gardens in Milan, which is 40 metres high, is said to be probably the finest.

Other famous trees are in the gardens of the Villa Carlotta on Lake Como, and of the Grand-ducal Palace at Carlsruhe, and there is a fine old pair in the Botanic Gardens at Geneva. There is a specimen in the Luxembourg Gardens in Paris, near the eastern entrance from the Boulevard Saint-Michel. Washington, D.C., possesses a complete avenue of *Ginkgo*. It would be beyond the scope of this note to quote more than a few of the more notable specimens mentioned in the list given by ELWES and HENRY, though it might well be of interest if a new list could be compiled, as further specimens may have been discovered since ELWES and HENRY wrote, forty years ago, and it is to be feared that some of those they mention may have been destroyed during the war.

In this country, the tallest *Ginkgo* is said to be the one in Lord Ilchester's grounds at Melbury, which is over 80 feet high. There are well-known trees at Kew and at Blaize Park, a public garden in Bristol; and in two famous old Cornish gardens—Enys and Carclew.

To conclude with Hampshire, we may mention the specimens at Blake's near Lymington; at Braemore Park, near Fordingbridge, and at Broadlands, Romsey. It would be interesting if, merely for this county alone, an up-to-date list could be compiled.

THE CORRESPONDENCE IN *The Times*, FEBRUARY AND MARCH, 1936

This correspondence was initiated by Sir Herbert Maxwell, who wrote about a very fine specimen in the park of The Grove, Watford, which property had just been sold by Lord CLARENDON (letter published 26 February). There followed more than a score of letters from various correspondents, and a leading article on the romance of the *Ginkgo* (11 March).

The following are some of the points mentioned in the letters.

Trees trained over walls produce more and much larger leaves than those planted in the open (specimens at the University Botany School, Cambridge).

Many trees planted of late years are fastigiate varieties, bearing the same relation to " the true *Ginkgo* " that tall Lombardy Poplars do to Black Poplars.

The British Museum (Natural History) possesses a single leaf collected by KAEMPFER in Japan in 1691–92.

In 1775 THOMAS BLAIKIE, a Scottish gardener, was in Geneva and visited PAUL GAUSSEN who had in his garden at Bourdigny the first female specimen of the *Ginkgo*.

Some of the notable specimens mentioned: Linton Park, 80 feet., Haslemere Educational Museum, 74 feet., Carclew, 73 feet., Enys, 70 feet, Knap Hill, 71 feet, Bicton, 67 feet, Orton Hall, Penjerrick, Ashridge, Corsham, Binstead Wyck (near Alton), Worden Hall (Leyland, Lancs.), Bloxholme Rectory, Lincoln (a tree with three main stems, girth below the fork, 8 feet 6 inches). In Loudon's Arboretum, 1838, there are references to several specimens growing in England at that time.

The correspondence closed on March 18 with a letter recalling Goethe's lyric in the " Westöstlicher Divan."

In Mr. L. J. F. BRIMBLE's *Trees in Britain* (Macmillan, 1946) there is a description of the *Ginkgo* and a reproduction of a pencil drawing by the late Archdeacon LONSDALE RAGG of a very fine specimen in the garden of the Bishop's Palace at Wells.

A drawing by Archdeacon RAGG of the trees at Corsham Court was published in the *Tree Lover*, April 1933.

Mr. H. C. EDLIN's *British Woodland Trees* (Batsford, 2nd edition, 1945) also contains an account of the *Ginkgo* with a photograph of the big tree at Kew, and drawings of the leaf and fruit.

(The writer of the foregoing note desires to acknowledge his indebtedness to the authorities of the Royal Botanic Garden in Edinburgh for their great kindness in placing at his disposal the materials from which it has been compiled.)

SOURCES USED IN COMPILING THE ABOVE NOTE.

ELWES & HENRY : *The Treesof Great Britain and Ireland*, Vol. 1.
D. H. SCOTT, 1924 : *Extinct Plants and Problems of Evolution.*
A. C. SEWARD & Miss J. GOWAN, March 1900 : *Annals of Botany.* (This has a bibliography and a reproduction of a Chinese painting.)
Sir ALBERT SEWARD, May 1, 1937 : *The Geological History of the Maidenhair Tree and its Allies in Nature.*
Sir ALBERT SEWARD, January 1938 : Article in *Science Progress.*
EDWARD CAHEN, April 1943 : " The Ginkgo through the Ages," in *R.H.S. Journal.*

NOTES FROM FELLOWS

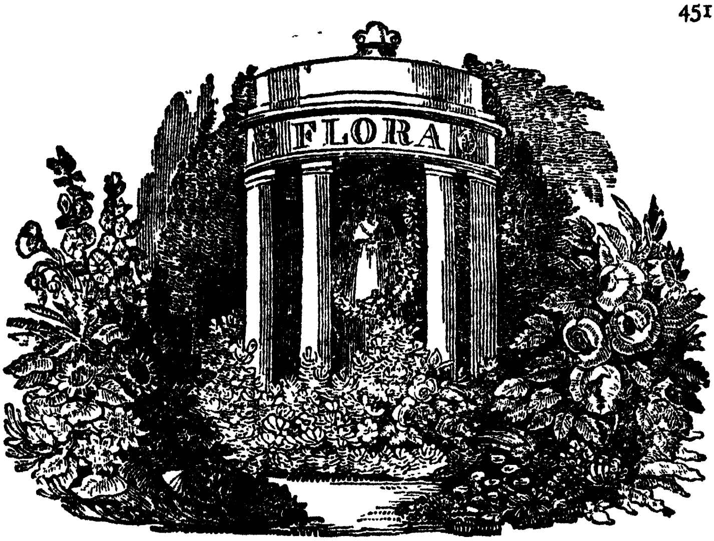
Dr. Thornton's Royal Botanical Lottery, 1811

THROUGH the kindness of Mr. GURNEY WILSON it is possible now to reproduce in the JOURNAL one of the original circulars issued in connection with Dr. THORNTON's Lottery (see *J:R.H.S.*, July 1947, p. 281).

The language of enticement varies little, apparently, from one century to another, but little enticement would seem necessary to a gamble which guaranteed one prize to every pair of tickets. Though, on the other hand, it is difficult to see how a lottery which raised only £42,000 and dispensed prizes worth £77,000 could ever have been expected to benefit its promoter.

The material of some of the prizes—and of the most valuable—no doubt to some extent existed already. But, in the circumstances, one may doubt how far it had been paid for. And the watermark of a large number of the plates surviving to-day shows that they were printed in 1810, *i.e.* that they were made expressly to furnish the prize sets and therefore represent additional cost.

Again, even if one allows for " Seller's Valuation " in the schedule of prizes, quite disproportionate devaluation would be necessary to bring



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CONSISTING ENTIRELY OF BRITISH MANUFACTURE,

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For the Scheme See Over-leaf

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Each containing THE TEMPLE OF FLORA, being Representations of the choicest Flowers of Europe, Asia, Africa, and America, NEW ILLUSTRATION OF THE LINNÆAN SYSTEM, and PHILOSOPHY OF BOTANY, making together Five Grand Volumes, including several Hundred Plates, by those most eminent Artists BARTOLOZZI, EARLOM, LANDSEER, MILTON, LOWRY, TOMKINS, DUNKARTON, WARD, &c. &c. (the Plates afterwards to be destroyed, according to Act of Parliament), each set of these Grand National Works is valued at £80. .... £15,920

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Each being a Copy of the BOTANICAL COLOURED PLATES in the TEMPLE of FLORA, forming a most elegant Port-folio of Botanical Flower Plates, with a Descriptive Catalogue in 8vo. value £30 each Copy £6,000

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Each being the TEMPLE of FLORA, 4to. Size, richly coloured, and Letter-Press, valued at £15 each.................................. £9,000

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Viz. FLORA of the UNITED KINGDOM, being a Description of every British Plant, and their Virtues, 400 Plates, Five Volumes 8vo. valued at £10 each £20,000

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Viz. ELEMENTS of BOTANY, Two Volumes 8vo. with 200 Plates, valued at £3 each £21,000

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Of THORNTON's ROYAL BOTANICAL LOTTERY,

PRICE ONLY £2. 2s. EACH, MAY BE HAD OF

Sherwood, Neely, & Jones

Booksellers, PATER-NOSTER-ROW.

Lewis and Ruffy, Printers, 29, Budge Row, London.

the level of cost down to that of receipts: beyond that the expense of running the lottery, and THORNTON'S profit, would still have to be provided for. It may be noted that the value of the fifth and sixth prizes alone is put at £41,000, or only £1,000 less than the total receipts to be hoped for from sales. It is probable, however, that the monetary status of the prizes as set out in the circular is quite unreal except where it represents debts.

Perhaps THORNTON might have been more successful if he had not made his lottery a British venture, but had extended his field to the Continent. His public in Britain alone was obviously too small. But the facilities for such operations—triumphantly exploited by the Dublin Sweep in recent times—did not exist in his day.

He expected, of course, that the lottery would solve all his financial difficulties, impossible as this would seem to us on the face of it, and perhaps someone with experience in organising such affairs may be able to throw light on it for us. In any case, it would be interesting to know why the number of tickets was fixed at 20,000, how many were actually sold, who—if anyone—advised THORNTON in drawing up his scheme, and who won the magnificent first prize, which included not only the original paintings for the plates but a copy of each of the other prizes as well. This information might perhaps be found in Society periodicals of the time.

In the latter half of the Circular are set out the Inducements, of which the best and most distinctive are reprinted here.

The wish of every enlightened Person to possess such Books in his Library.
Or the pleasure of presenting such agreeable and useful Works to Ladies, or to the younger Branches in Families. And, as the Poet Thomson says,

> . . . Shall BRITONS, in the field
> Unconquer'd still, the better laurel lose?
> In *Finer Arts*, and *Public Works*, shall *they*
> To GALLIA yield? . . .

The answer is,—The present ROYAL BOTANICAL LOTTERY will convince our ENEMIES, that ENGLISHMEN can and will encourage the Fine Arts, and that *this Country* can produce when encouraged, such Works as no other Nation can boast of.

F. M. G. CARDEW.

Eucalyptus in England

It seems desirable to correct the impression which appears to be fairly widespread that *Eucalyptus Gunnii*, 'the Cider Gum,' is the principal frost resistant species of this genus. Nearly all inquiries received in Tasmania are for this species but there are others which are equally, if not more, hardy and are much more useful.

E. coccifera is a handsome tree with an attractive bark and foliage, producing a useful timber or wood of a very good burning quality.

It will tolerate snow for six months of the year and is found in Tasmania at an altitude of 4,200 feet.

E. subcrenulata has beautiful dark glossy foliage and an extremely handsome bark which at bark-shedding time is most spectacular.

Both these species are probably more cold resistant than *E. Gunnii*, while *E. urnigera*, *E. cordata* and *E. Perinniana* are probably equally so.

Anyone with a sheltered sunny corner to spare is recommended to try the last two mentioned, for as spectacular decorative foliage they are both difficult to equal.

E. cordata has large silvery glaucous leaves both in the juvenile and adult forms.

E. Perinniana in the juvenile stage, which can be maintained indefinitely by pruning, has perfectly circular silver perfoliate leaves which are most useful and extremely decorative.

A limited supply of seed of all the above-mentioned is available and has been forwarded to the Director of R.H.S. Gardens, Wisley, for inclusion in the seed distribution.

D. MARTIN,
Australia House, Strand, London, W.C. 2.

PLANTS TO WHICH AWARDS HAVE BEEN MADE IN 1947

Chrysanthemum 'Carol.' A.M. August 26, 1947. An early flowering disbudded variety, for exhibition. Flowering stems stout, 20 inches long, clothed with medium-sized foliage. Flowers double, 4½ inches diameter, rose-pink with a gold reverse; inner petals incurved, outer reflexed. Raised and shown by Messrs. J. & T. Johnson, Tibshelf, Derbyshire. (See p. lxxx.)

Chrysanthemum 'Edensor.' A.M. August 26, 1947. An early flowering disbudded variety, suitable for market. Flowering stems 22 inches long, clothed with dark green medium-sized foliage. Flowers double, 4½ inches diameter, creamy-white, inner florets cream. Raised and shown by Messrs. J. & T. Johnson, Tibshelf, Derbyshire. (See p. lxxx.)

Chrysanthemum 'Vanguard.' A.M. August 26, 1947. An early flowering disbudded variety, suitable for exhibition. Flowering stems 20 inches long, clothed with medium-sized dark green foliage. Flowers double, 4½ inches diameter, crimson-bronze with a gold reverse. Raised and shown by Messrs. J. & T. Johnson, Tibshelf, Derbyshire. (See p. lxxx.)

Delphinium 'Jennifer Milligan.' A.M. July 1, 1947. As an exhibition variety. Flower spikes 2¼ feet long, pyramidal with few strong spikes. Flowers semi-double, 2½–3 inches diameter, outer petals pinkish-mauve lightly suffused with pale sky-blue, inner pinkish-mauve; eye black and mauve, prominent. Raised and shown by H. R. N. Richett, Esq., Ford's Farm, Pirbright, Surrey. (See p. lxxiii.)

Dianthus pindicola. A.M. July 1, 1947. A small growing prostrate Dianthus covered with Roseine Purple (H.C.C. 629) flowers ¾-inch in diameter. The leaves are light green ½ to ¾ inch long, ¼ inch wide. The flowers are carried on short stalks up to 2 inches long, with fimbriate petals and prominent twin stigmas projecting nearly ½-inch above the centre of the flower. Exhibited by Messrs. W. E. Th. Ingwersen, Birch Farm Nurseries, Gravetye, East Grinstead, Surrey. (See p. lxxiv.)

Hydrangea macrophylla var. 'Générale Vicomtesse de Vibraye.' A.M. August 12, 1947. A hardy flowering shrub of great beauty raised by Mouiliere in 1908. It bears with great freedom medium sized heads of butterfly blue (H.C.C. 645/1) flowers and it is said to be the most reliable variety for natural blue colouring. Exhibited by G. H. Dowty, Esq. (gr. Mr. J. M. Grant), Grayswood Hill, Haslemere. (Fig. 165.) (See p. lxxix.)

Laeliocattleya 'Princess Ishtar' var 'Mary.' A.M. July 29, 1947. The spike bore two large and well-formed flowers, the sepals and petals rich purplish mauve, the expansive labellum crimson-purple with a frilled margin. The result of crossing *Lc.* 'Ishtar' with *Lc.* 'Princess Margaret.' Exhibited by Mr. Clint McDade, Rivermont, Tennessee, U.S.A. (See p. lxxvi.)

× Lewisia 'Weeks's Seedling,' A.M. July 1, 1947 (probably *L. rediviva* × *Howellii*). An interesting seedling raised by the exhibitor, which is remarkable for its prolonged flowering season. The plant exhibited had several fully opened flowers, numerous buds in all stages of development and many faded flowers had been removed. The leaves are ligulate 3½ to 4 inches long, dark green and slightly glaucous above, forming a loose rosette, 8 to 9 inches in diameter. Flowers 1½ inches across, pale pink, the centre of each petal being heavily marked with dark pink lines converging towards the base. Petals ¾ inch long, ¼-inch wide, slightly notched at the apex. The flowering stalks which bear up to three blooms each reach a height of 5 or 6 inches. Exhibited by A. G. Weeks, Esq., The Weald Cottage, Limpsfield Common, Surrey. (See p. lxxiv.)

Philadelphus 'Beauclerk.' A.M. July 1, 1947. Raised by the exhibitor from the cross 'Sybille' ♀ × 'Burfordiensis,' this is a vigorous hybrid of a very free-flowering character. The fragrant flowers are carried in rather crowded racemes five or seven together. Each is well over 2 inches wide, with broad-ovate or orbicular petals notched at the tips and often slightly crimped and toothed on the margins, faintly stained with purple at the base. Exhibited by the Hon. Lewis Palmer, Sutton Scotney, Hants. (See p. lxxiii.)

Rose 'Crimson Glow.' A.M. July, 1, 1947. A vigorous and very free flowering hybrid polyantha variety, raised as the result of the cross between 'Donald Prior' and 'Orange Triumph.' The bright crimson, semi-double flowers measure 2½ inches across. Raised and shown by Mr. H. Robinson, Victoria Nursery, Burbage, Hinckley, Leicestershire. (See p. lxxii.)

Rose 'Fantasia.' A.M. July 15, 1947. A Hybrid Tea variety with well-shaped, fully double, richly scented flowers of medium size. The colour is Buttercup yellow (H.C.C. 5/2) deepening to (H.C.C. 5) at the base of the petals and with a cadmium-orange suffusion at the centre. Shown and raised by Messrs. Alex Dickson & Sons, Ltd., Hawlmark, Newtownards, nr. Belfast. (See p. lxxv.)

Rose 'Spek's Yellow.' A.M. July 15, 1947. A Dutch variety raised by Mr. Jac Verschuren. It is a strong grower and has very fragrant flowers of excellent shape and medium size. The colour is Aureolin (H.C.C. 3), which is said to last exceptionally well. Shown and introduced by Mr. Jan Spek, The Nurseries, Boskoop, Holland. (See p. lxxv.)

Rose 'Victoria.' A.M. July 1, 1947. A very pleasing and vigorous H.T. variety which resulted from a cross between 'Phyllis Gold' and 'Golden Dawn.' The large, full, well formed flowers are sulphur yellow (H.C.C. 1/3) deepening to canary yellow (H.C.C. 2) at the base of the petals. This rose was awarded a first-class certificate by the National Rose Society after trial at Haywards Heath. Raised and shown by Mr. H. Robinson, Victoria Nursery, Burbage, Hinckley, Leicestershire. (See p. lxxii.)

BOOK NOTES

"Conservation of Nature in England and Wales." Report of the Wild Life Conservation Special Committee. (H.M.S.O.) 4*s*.

Many of the problems raised by a study of these proposals for the Conservation of Nature in England are of great interest also to the horticulturist. The Committee, drawn from the leading plant and animal ecologists in the country, decided at the beginning that we had not sufficient knowledge of the factors controlling a balance of Nature to enable man to exercise any certain control. As the report expresses it, "What has to be done to enable man to control nature so as to maintain or establish a series of varied and most delicately balanced conditions? Although so simple in form it is one of the most difficult and intricate questions which science can be asked; so great is the complexity and variety, so nice is the balance." It is in the establishing of such a balance that the success or failure of the gardener often lies. Consequent upon this admission the main recommendation is for the establishment of a National Biological Service, who will, not only be able to manage the proposed National Nature Reserves of 70,000 acres, which would be specifically dedicated to scientific purposes, but also conduct research into the highly involved series of interactions which control the balance of nature and the factors of micro-climate which contribute to it. A subsidiary recommendation of value to gardeners is for a comprehensive soil survey and the organisms inhabiting different soils.

The Committee have realised that the "typical" is valuable and should be preserved as well as the "unique," and emphasize that an important part of our biological education is contained in the study of the ecological stages and vegetation climaxes indigenous to the country. Therefore their areas for reservation include such sites as a typical piece of oak-hazel wood with coppice and standards. They have also realized that no Nature Reserve can be static and that it is not enough merely to fence off an area and leave it to itself. The results of such a passive and misguided policy are only too obvious to those who have experienced its application. A "sanctuary" run on these lines may become a focus for noxious weeds and destructive animals and a menace to surrounding farmers and landowners.

This report contains many practical recommendations which should prove of wide interest to all those who value, not only our native flora and fauna, but also the wider environment of scenery and landscape which conditions it.

P. M. SYNGE.

"Trees for Town and Country." Compiled for the Association for Planning and Regional Reconstruction. By Brenda Colvin and Jaqueline Tyrwhitt. Drawings by S R. Badmin. (Lund Humphries) 25*s*.

This is a book written primarily to act as a guide to the town and country planner, indicating suitable trees to be used in the decoration of the urban and rural scene. It is well compiled and the text contains such information as details of soil, growth and habitat, in addition to a short description, which are both interesting and instructive.

It would be easy to criticise the selection of the sixty trees detailed : probably no two horticulturists would compile identical lists, but if the Judas tree is included, we might also mention Liquidambar. The Elm—both *Ulmus campestris* and *U. stricta Wheatleyi*—might be eliminated. They are both subject to the Dutch disease, although it was hoped at one time that the latter was immune. However, it is not necessary to go further afield than Western Avenue on the road to Uxbridge to see, unfortunately, that this idea is erroneous, and that the young trees there have been attacked and killed. In addition, the common Elm is too dangerous a tree for planting in any area to which the public has access. Nor is it really suitable as a hedgerow tree, as its surface roots impoverish the adjacent agricultural ground.

The full-page photographs are excellent, especially the Oaks and *Nyssa sylvatica*, and attention is rightly drawn to the difficulty of transplanting the latter. *Populus serotina*, the black Italian Poplar is another dangerous tree on account of its heavy, horizontal limbs which break, often on still hot days, and might be eliminated. The public, however, is impatient, and it is a common feature of the landscape because something which will grow quickly is required One would have liked to have seen some of the American Thorns included, and if so shrubby a plant as the Blackthorn is selected, some of the tree Magnolias and Cotoneasters might have found a place. *Eucalyptus Gunnii*, or Blue Gum, is rightly referred to as only suitable for the warmer parts of this country. The variety *whittinghamensis*, however, is very much hardier, and will stand zero frosts.

Under Lawson's Cypress, the photograph depicts one of the varieties, probably *erecta viridis*, not the type described in the text and shown in the side drawings.

The drawings throughout are admirable and appear to have been done with the utmost care and accuracy.

The whole book, from the illustration of bark on the outer cover to the index with its special lists, is very attractive, and will prove a welcome addition to the library of any horticulturist or landscape architect.

"Shrubs and Trees for Everyman's Garden." By G R Jackman and F. A. Bush. (Garden Publications, Ltd , 55 Russell Square, W C. 1.) 7*s*. 6*d*.

Gardening books are of two kinds, those which deserve a serious notice and those which do not This is an excellent book which well achieves the purpose of giving instruction to beginners in a form that beginners can easily grasp and would be able to put into practice. The photographs are unusually helpful because they display truly the character of the plants depicted, and the drawings by Arthur Prensky attain with great success the object of showing really clearly the practical work that is recommended.

The first chapter gives briefly the history of trees and shrubs and of the people who were responsible for their introduction : this unusual feature is a particularly happy one since it affords an introduction to the romance of gardening The chapters on planting, pruning, staking and propagation are admirable, the methods are well and fully described and convey information and suggestions that some gardeners of wide experience will find valuable. It seems a pity that neither instruction nor warning is given respecting nomenclature, a subject that is the cause of much stumbling and confusion to beginners ; moreover, the nomenclature in the text is not impeccable.

A list of shrubs and trees for different purposes and a calendar therefore is obviously a difficult task, it always risks seeming too short or too long ; in this book the list seems too long for real beginners, yet some important genera are dealt with so casually as to be misleading ; it is the weakest part of a good book However, it can be truly said (as a reviewer recently wrote of a book upon Art) that this is also a book upon Art that is worth every penny of the price that is asked for it.

CHARLES ELEY.

"The Rock Garden and Alpine Plants" By G. A. R. Phillips. 251 pp. and numerous illustrations. (Messrs. W. H. L. Collingridge, Ltd.) 15*s*. net.

This is an ambitiously conceived book, but the result is disappointing. Its many and delightful illustrations will, no doubt, find it many friends, but the serious gardener is left with the impression that an attempt has been made to cover too much ground in too limited a space. In a bare forty pages the construction and maintenance of rock gardens, rock banks, dry walls, paved paths, Japanese gardens, ponds, streams, bog gardens, moraines, Alpine houses, frames, window boxes, sinks, troughs and the propagation of alpine plants have all been dealt with, mostly in a very sketchy manner. The remaining two hundred pages are mostly devoted to lists of plants considered suitable to the various purposes and include several chapters descriptive of alpine and other plants, annuals, bulbs, shrubs, ferns and hardy Orchids. The purist will raise his eyebrows at the inclusion of such plants as *Dracocephalum virginianum Vivid* (*sic.*), *Stokesia cyanea*, *Anemone japonica* and the dwarf Michaelmas Daisies, to say nothing of Clarkia, Sweet Scabious, Eschscholtzia, Marigolds, Godetia, Nigella, etc. One questions whether the Acaenas with their little hooked burrs, *Acantholimon glumaceum*, prickly as a hedgehog, Sedums and Sempervivums, slippery as banana skins under foot, are practical suggestions for the furnishing of paved paths. The author rightly surmises that the orthodox minded will look askance on the inclusion of Japanese gardens. The occidental mind can never fully understand the esoteric meaning behind this art and the Japanese garden does not bear transplanting from its own setting. Why attempt it? Our English gardens have a charm and character all their own and spurious imitations of Japanese gardens can never fit harmoniously into the English scene

The book is well produced and the indexing has been most carefully done.

"Carnations for Everyman." By Montagu C. Allwood, F.L.S (Allwood Bros, Haywards Heath, Sussex, Ill.) Price, 3*s*. 6*d*.

This is a new edition of a valuable little book which was first published in 1931. Since then it has passed through several editions and in each case has been brought up-to-date with the newest advances. No one who visits the R.H.S. shows regularly would dispute Mr Allwood's authority to write on Carnations. This little book deals with the different forms of Carnation which are available: Border Carnations, "Allwoodii's," Greenhouse Carnations, Pinks and Dianthus for the rock garden, together with chapters on propagation, soil compost, cultural treatment, pests and even commercial cut flower production. This new edition can certainly be recommended to all growers of Carnations.

"La Forme des Végétaux et le Milieu." By R. Combes. Librairie Armand Colin. Paris, 1946.

In very clear and simple language the author indicates in this little book how the shape and structure of plants is influenced by the various factors of its surroundings. This is due to the plasticity of plants which respond by various reactions to external conditions. M. Combes shows that such responses can be observed both in very simple unicellular organisms like Algae and Fungi as well as in highly organised plants. He deals in successive chapters with the influence of temperature, light, water and various chemical agents, showing how they contribute to the nutrition and the growth of plants and how they may cause both a change of internal structure and of external shape His treatment of the subject is therefore in part physiological, in part morphological.

Some passages will be found of special interest to horticulturists. Thus in dealing with the effect of temperature he discusses not only the minimum, the optimum and the maximum temperatures of plants, but deals also with the effects of frost and the resistance of certain plants to very low temperatures, describing certain methods of cultivation by which the resistance to frost may be increased.

In dealing with the effect of light the author has several paragraphs concerning the interesting differences of plants towards long and short daily periods of illumination. The result of this is that some plants flower during the long days of summer and others in the short autumn days. He tells us that the Chrysanthemum, which normally flowers during the short autumnal days, can be made to flower in the summer by cutting off some of the hours of June and July daylight.

In a very interesting chapter on the effect of certain inorganic and organic chemicals added to the nutritive medium of plants, Mr. Combes gives some remarkable facts of the alteration both of the internal structure and the external shape induced by the addition of sugar to the ordinary food of plants. In all cases he quotes the numerous authorities, who have contributed to our knowledge of plant nutrition and the responses to various external factors. The final chapter deals with the modifying effects of the various natural surroundings of plants and thus takes up the subject of plant ecology, showing how it is dependent on the physiological responses he has discussed in the earlier chapters. The readable text is made more helpful by the addition of a number of well-chosen illustrations, and at the end of the book a list of authorities, who have dealt with some of the subject matter of M. Combes' book, will enable the readers to enlarge their knowledge by further study of the available literature of the subject.

F. E. WEISS.

" Practical Soil Sterilisation with special reference to Glasshouse Crops." Bulletin No. 22. Ministry of Agriculture (H.M.S.O.). Ill. 1*s*. 3*d*.

As Dr. H. V. Taylor says in his Foreword, " Soil sterilisation is now accepted by growers of crops in glasshouses as a necessary routine operation in the year's work." This bulletin has been compiled by a small committee under the chairmanship of Dr. W F. Bewley of Cheshunt and should be read with care by all commercial growers as well as by those amateurs specializing in greenhouse plants. The great advantages of sterilization by steaming are stressed

" Strawberries " Bulletin No 95 Ministry of Agriculture (H.M.S.O). Ill. 2*s*.

This Bulletin has been completely rewritten in the light of recent work on virus degeneration and other diseases by Mr. C H. Oldham, Dr W. S. Rogers and Dr. H. B. S. Montgomery and embodies the work of the research staffs both at East Malling and Long Ashton While written primarily for the commercial grower, this Bulletin should be most helpful to all amateurs who grow, or hope to grow, a small patch of strawberries. The importance of buying only certficated stocks of virus free plants is stressed.

" Garden Bulbs in Colour " By J. Horace McFarland, R. Marion Hulton and Daniel J Foley. (Published by J. Horace McFarland Co., Harrisburg, Penn, U.S.A , and distributed by MacMillan & Co) Price 15*s*.

This book, which first appeared in America in 1938, is most lavishly illustrated with colour photographs of bulbs Unfortunately, some of them are not quite as crisp as might have been desired. However, they serve well as a finely illustrated record of varieties which are available in America. Many have originated in Europe and will also be familiar to English readers while numerous species are also included The term " bulb " is interpreted liberally so as to include Dahlias, Kniphofias, Bearded Irises and many plants with a variety of corms and tubers.

" Garden Enemies " By Ursula Newman (Garden Publications, Ltd., W.C. 1). 1947. 7*s* 6*d*. net.

This present volume is a continuation of that line of books which have been published over a period of years attempting to enlighten the gardener as to the pests and diseases that attack his plants. Herein is presented a readable account of the entire range of organisms that ravage our fruit and vegetable crops, ornamental plants and glasshouse subjects. The ambitious character of the book is apparent from a perusal of the chapter headings Within the range of nine chapters comprising 100 odd pages, there appears an account of the more important insect and related animal pests, fungi, bacteria and viruses classified in an arbitrary manner ; while some attention is paid to deficiency diseases. Other chapters deal with the " Growing of Healthy Plants," " General Pests," " Fungus and other Plant Diseases," a " Spray Calendar for the Fruit Garden," " Weed Hosts of Pests and Diseases," and " New Insecticides."

The author has consulted with some care the various published reports of plant pathologists, and the preventive and remedial measures given are selected for their simplicity, though opinions will differ as to the selection made.

The work is illustrated with 16 coloured plates and 45 text figures. The former are not of a high standard, and with numerous omissions as to the relative size of the pests. The latter are of varying artistic merit where comparisons in skilful presentation are all too apparent. While due acknowledgment is made to the firm from whose catalogue 17 of the illustrations are used, no credit is given to the artist whose reputation in this field is world-wide. The inclusion of an almost complete Index is a refreshing feature in a book of this standard.

This handbook will furnish the keen amateur gardener with a host of facts relating to garden enemies, but the progress that is being made in the field of applied plant pathology is so rapid that many emendations are and will be necessary in a second edition.

G. FOX WILSON.

"More Labour Saving Gardens." By Hilda M. Coley. Cr. 8vo. 53 pp. Illus. (John Gifford.) 6*s*.

Many gardeners in these days are looking round for labour-saving devices. I am afraid that this book will not help them. It seems to bear very little relation to its title and there is very little meat and rather over much padding for my taste in it It consists of short essays on such subjects as "Fragrant flowers," "a garden of Shakespeare's flowers," Women gardeners and a wild flower water garden designed in an earthenware round pan. The housewife may, however, find a few useful hints on the subject of hayboxes, herbs or cleaning hands. The illustrations are poorly printed and captions such as "Flax—the dainty flower" are of very little use to those studying a seed catalogue and trying to decide which species or variety to order.

"A Posy of Wildflowers" By Victor Bonham-Carter. Illus. by Hellmuth Weissenborn. (Allan Wingate) 6*s*. 6*d*.

Though the fifty species illustrated by Mr. Weissenborn's woodcuts in this volume are among our commonest wildflowers, the three or four quotations chosen by Mr. Bonham-Carter for each species are refreshingly unhackneyed. The brief notes under each woodcut are somewhat unequal; in some cases well-known facts occupy valuable space which might have been given to some less obvious aspect of the plants illustrated. The authors, however, have produced a pleasant anthology in which, among a few old friends, most readers will find many that are new.

"Year Book for Mushroom Growers, 1946." (Midland Group Publications, Yaxley, Peterborough.) 2*s*. 6*d*.

This year book is intended primarily for the commercial Mushroom grower and is obviously the production of a keen and active group. Probably the most interesting section is that dealing with experiments in synthetic composts from the amalgamation of sewer sludge with an absorbent carrier such as dried peat. It is regretted that these experiments are not given in greater detail. Also published by the same association is a small pamphlet on White Plaster Mould, by Fred C. Atkins, price 2*s*. 6*d*.

"Shade and Ornamental Trees for South Florida and Cuba." By David Sturrock and Edwin A. Menninger. Illus. (*Stuart Daily News*, Stuart, Florida, U.S.A.)

This book does not only deal with trees native to Florida and Cuba, but with all tropical trees which can be grown in this warm climate. As such it should be useful to gardeners in many parts of the tropics. It is lavishly illustrated.

ERRATA

IN the article by Mr. I. THOMAS, "Injury to Aster Seedlings by the Leaf Curling Plum Aphis (*Anuraphis helichrysi* Kalt.)," published in the JOURNAL of September 1947, it is regretted that owing to consideration of space a number of photographs had to be omitted. The accompanying notes to these photographs were also omitted from the middle of the article. This unfortunately has spoilt the sequence of thought and the author has kindly written an additional paragraph to complete the argument. This paragraph should be inserted after the 3rd paragraph of the article at line 16, page 370:

"The development of the infested and controlled plants showed clearly that those plants infested with *A. helichrysi* developed a typical crinkled condition of the leaves, whilst those of the controlled plants remained free from these symptoms."

The Editor's apologies are due to Mr. THOMAS for this regrettable omission.

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JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

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THE SECRETARY'S PAGE

December Meeting.—The last of the Society's Meetings and Shows for the year will take place on Tuesday, December 2 (12 noon to 6 P.M.), and Wednesday, December 3 (10 A.M. to 5 P.M.). On Tuesday, December 2, Dr. Janaki Ammal will deliver a lecture on "Chromosomes and Horticulture." The lecture will be at 3 P.M. in the Lecture Room of the New Hall.

In conjunction with the Show there will be a Late Apple and Pear Competition, schedules of which may be obtained from the Secretary.

Programme for 1948.—The Annual Meeting to receive the Report of the Council for 1947 and a statement of the accounts for that year will be held on Tuesday, February 17, 1948, at 3 P.M. in the Lecture Room of the New Hall; there will also be a Show on that and the following day.

The following Calendar of Meetings and Shows has been arranged:—

February 17, 18.
March 2, 3
March 16, 17
April 6, 7.
April 13, 14
April 20, 21.
May 4, 5.
May 26, 27 and 28 (Chelsea Show)
June 8, 9.
June 22, 23.
July 6, 7.
July 20, 21.
August 10, 11.
September 7, 8.
September 21, 22.
October 5, 6.
October 19, 20.
November 2, 3.
November 30, December 1.

The following competitions will be held:—

April 6, 7	Daffodil Competition and Sewell Medal Competition for Alpines.
April 13, 14 . . .	Daffodil Show.
May 4, 5	Rhododendron Competition and Sewell Medal Competition for Alpines.

May 26, 27 and 28	Chelsea Show. Flowering Tree and Shrub Competition and Flower Arrangement Competition.
June 22, 23	Flowering Tree and Shrub Competition.
July 20, 21	Summer Fruit and Vegetable Show.
August 10, 11	Hardy Flower Competition and Foremarke Cup Competition for Gladioli.
September 7, 8	Cactus and Succulent Competition for Amateurs, Flower Arrangement Competition for Amateurs and Plum Competition for Amateurs.
October 5, 6	Autumn Fruit and Vegetable Show and Flower Arrangement Competition for Professionals.
October 19, 20	Tree and Shrub Competition.
November 30, December 1	Late Apple and Pear Competition.

Any changes in this programme will be announced in future issues of the JOURNAL on this page.

Demonstrations at Wisley.—The following demonstrations will be held at Wisley during 1948 :—

Vegetable Garden.

March 3, 4.—Outdoor Seed Planting and Seed Sowing. (2 to 4 P.M.)
May 12, 13.—Thinning, Transplanting and Successional Cropping. (2 to 4 P.M.)
September 15, 16.—Harvesting and Storing. (2 to 4 P.M.)
October 6 and 7.—Digging, Trenching, Manuring and Composting. (2 to 4 P.M.)

Fruit Garden.

March 24 and 25.—Spring Spraying of Fruit Trees. (2 to 4 P.M.)
July 7 and 8.—Summer Pruning of Fruit Trees. (2 to 4 P.M.)
November 3, and 4.—Planting of Fruit Trees and Roses. (2 to 4 P.M.)
December 1 and 2.—Pruning of Fruit Trees. (11 A.M. to 1 P.M.)

Flower Garden.

March 10 and 11.—Rose Pruning and Pruning of Shrubs. (2 to 4 P.M.)
March 17 and 18.—Seed Sowing and Vegetative Propagation of Alpines. (2 to 4 P.M.)
June 2 and 3.—Summer Pruning of Shrubs. (2 to 4 P.M.)
August 4 and 5.—Vegetative Propagation of Shrubs and Herbaceous Plants. (2 to 4 P.M.)

Wisley Gardens.—Fellows are reminded that the gardens are closed on Sundays until April 4, 1948.

Lectures.—A programme of lectures is being arranged, and their subjects and dates will be given monthly in the JOURNAL.

The Society's Examinations.—Candidates who wish to enter for the Society's Examinations in Horticulture in 1948 are reminded that the closing dates for entry forms are as follows :—

General Examination in Horticulture and General Examination in Horticulture for Juniors.—Monday, January 19, 1948.

Examination for the National Diploma in Horticulture (Preliminary and Final) and N.D.H. (Honours).—Monday, February 2, 1948.

Examination for Teachers of School Gardening (Preliminary and Final).—Friday, April 30, 1948.

The Horticultural Colour Chart.—The new printing of the R.H.S. Colour Chart has been completed, and the first copies are now being delivered. We are now in a position, therefore, again to supply complete copies of this work. The price is £2 4*s.* per copy (two volumes), plus postage 1*s.* at home, 2*s.* overseas. The Colour Chart appears to fill a long felt want in Horticulture as its use is spreading rapidly. This is typified by a bulletin which we have just received, published by the Arnold Arboretum, Harvard University, and which is entirely devoted to the need of uniform colour standards in American Horticulture. This JOURNAL strongly recommends the adoption in America of the R.H.S. Colour Chart as the standard.

Overseas Fellowship.—The Council of the Society has decided to inaugurate another class of Fellowship in the Society which shall be open only to fellows resident overseas. The Council has for some time been conscious of the fact that Fellows resident overseas do not get the same opportunities for enjoying full privileges of Fellowship as do those resident in the United Kingdom. The subscription payable by the new category will be at present 1 guinea per annum. In return for this an Overseas Fellow shall be entitled to the following privileges:—

(1) To receive a copy of each issue of the Society's monthly JOURNAL.
(2) To receive free technical advice by letter.
(3) To receive, on application, a share of such surplus seeds as may be available for distribution from the Society's Gardens at Wisley.
(4) To recommend any Lady or Gentleman for election.
(5) To vote at any meeting of the Society which he may be able to attend.
(6) When on a visit to the United Kingdom to receive a ticket which will:—
    (i) Admit him to each Show held by the Society, including admission to Lectures.
    (ii) Admit him and three friends to the Society's Gardens at Wisley.

This ticket shall be valid for the duration of the visit or for a period of three months, whichever is the less.

Overseas Fellows will always be welcome at the Society's Offices and are cordially invited to visit the Library to consult the books therein contained.

Publications.

Year Books.—The Fruit Year Book, 1947, and the Daffodil and Tulip Year Book, 1947, will be available in December. The Fruit Year Book is the first number to be published and contains many

Flowers—continued.

Lupins, perennial varieties
Nasturtium
Nicotiana
Pansies
Polyanthus } sown in 1947
Primula malacoides varieties, sown July 1947
Scabious, annual varieties
Scabious, perennial varieties
Solidago
Tagetes
Tulip, hybrids and varieties of *T. Kaufmanniana* and *T. Greigii*

Preparations for Trials in 1948

Vegetables

Brussels Sprouts, ½ oz. of each variety
Radishes, European-grown seed only, 2 oz. of each variety
Peas, late varieties, ½ pint of each variety
} Entries to be received at Wisley not later than January 31, 1948.

Flowers

Tagetes, ⅛ oz. of each variety. Entries to be received at Wisley not later than January 31, 1948.

Perennial Coreopsis
Solidago
} Three plants of each variety. Entries to be received at Wisley not later than February 28, 1948.

Preparation for Trials in 1949

To prepare for trials in the Biennial Calendar, some of the seeds are required sufficiently in advance to become established by the time appointed for their consideration by the judges, namely :—

To be sent in 1948 for judging in 1949 } *Primula obconica* One packet of seed of each variety. Entries to be received at Wisley not later than May 31, 1948.

Plants and Seeds for Invited Trials

Anyone desring to send a variety or strain to an invited trial must obtain from the Director of the Gardens an entry form which must be completed and returned by a specified date. The entrant must certify on the form either

(*a*) that the variety or strain has been raised or developed by him
or (*b*) that the variety or strain was, or is about to be, introduced by him to British Commerce.

The entrant must also supply sufficient particulars of the history of the variety or strain to substantiate his certificate, but such particulars will not be published by the Society without the sender's consent.

To provide a standard for comparison, varieties which have previously received an F.C.C. or an A.M. will, usually, be included in a trial, but no such variety can be accepted for trial unless the prospective sender certifies that what he proposes to send represents an improved or re-selected strain of the variety, and unless he, at the same time, supplies sufficient particulars of the history of the strain to substantiate his certificate.

The entries for an invited trial will be examined by a Sub-Committee, who will decide what entries shall be accepted and what standard varieties shall be included for purposes of comparison. Each entrant will be notified by the Director of the Gardens of the Sub-Committee's decision in regard to his entry, and, if the decision is favourable, the entrant will be asked to send a specified quantity of plants, seeds, bulbs, or other material to Wisley by a stated date.

WISLEY IN DECEMBER

AT this season of the year few plants will be found flowering in the open, but a few hardy shrubs produce flowers with every spell of mild weather, particularly *Viburnum fragrans*, a native of North Western China long cultivated as a garden plant by the Chinese and introduced to England from this source some years before the discovery of its natural habitat. The largest specimen at Wisley is in the Award of Garden Merit Collection, while others are planted in the Wild Garden. Slight shade or very thin woodland conditions seem to suit the plant best, but it is a most accommodating subject on almost all soils. *Mahonia japonica* is another winter-flowering shrub with a very prolonged flowering period, opening the first of its yellow blossoms this month on drooping sprays, which elongate slowly as the display continues. A damp situation with shade from hot sunshine is essential to obtain good results with this plant. Here it flourishes in the shade of *Magnolia grandiflora* by the side of the path leading from the greenhouses to the Wild Garden.

The vast majority of flowers will be found in the greenhouses, many of them already noted in previous months. In the Half Hardy House *Narcissus Tazetta var Panizzianus*, a small white-flowered variety, joins *Lithospernum rosmarinifolium* and *Calceolaria Pavonii* in adding colour to the short winter days, while late blooms still linger on the small shrubs of *Fuchsia microphylla* and the unusual pink-flowered, shrubby *Antirrhinum speciosum*.

The Temperate House contains a large number of plants in bloom on the centre bed, Acacias, Epacris and Correas are in full flower, with the scarlet and orange of *Jacobinia pauciflora* (*Libonia floribunda*), while *Hibbertia volubilis* and *H. dentata* produce a succession of yellow flowers as they twine round the roof supports on the east side of the house. Both in the centre beds and in numerous pots on the side staging the Camellias will be producing their white, pink or crimson blossoms with increasing frequency as the year draws to an end.

Leaving the greenhouses a walk round the remainder of the Gardens will be well repaid if the weather is not too inclement. In the Award of Garden Merit Collection *Cotoneaster rotundifolia* is well covered with berries which last into the New Year. *Erica × darleyensis* will be opening its first flowers and *Viburnum fragrans* has already been mentioned. In Seven Acres Berberis and Cotoneaster fruits are still much in evidence while some of the latter, like *C. pannosa* and *C. glaucophylla* do not obtain their full berry colour until this month. Now all the leaves have fallen the brightly coloured bark of *Salix vitellina pendula*, *S. v. britzensis* and *S. daphnoides* is very pleasing, while the smaller growing *Cornus stolonifera* if regularly pruned hard back in the spring will produce 2 to 3 ft. red stems which brighten the shrub border during the winter months after its brilliant autumn foliage has fallen. Near the Northern boundary is a large tree of *Arbutus* × *andrachnoides*, a hybrid of *A. Unedo* and *A. Andrachne*, which in spite of suffering leaf damage during the severe winter of last year has now recovered, and will probably be carrying its white blossoms during the early part of the month.

In the Pinetum the many coloured forms of *Chamaecyparis* (*Cupressus*) *Lawsoniana* and *C. obtusa* add interest to the collection while the slate-blue *Picea pungens* var. *Kosteriana* is probably the most intense blue of all conifers; over the bridge towards Howard's Field is a finely coloured tree of *Chamaecyparis* (*Cupressus*) *nootkatensis* var. *aurea*, a rather unusual variety of an intense golden colour which seems to deepen as the winter advances.

The past year has produced almost every extreme of which our climate is capable. A harsh and bitter winter damaged or killed many plants in the Gardens, the small-leaved Ceanothus suffering most heavily, while many subjects growing on the various walls were also killed to the ground. No floods followed the thaw at Wisley as in other parts of the country, and the spring, if late, was almost free from May frosts which play havoc with our flowering shrubs and fruit crops. The freedom of flowering of many of our shrubs was outstanding, Forsythias, Lilacs, Philadelphus, and many others produced magnificent displays while a warm May gave way to one of the driest Junes on record and drought conditions were only broken by a storm of tropical intensity during mid-July.

The newly-planted Rhododendrons on Battleston Hill would have been severely tried but for constant overhead irrigation which enabled them to become well established, and by the early autumn several species were producing a few out-of-season blossoms. Warm dry weather continued in August and through most of September. Insect pests were much in evidence, red spider being particularly noticeable, attacking Limes in the London area and causing early defoliation, while the dry sunny weather robbed many of our earlier Chrysanthemums and Dahlias of their true colour; but thanks to the absence of hard frosts the latter were still making a brilliant display in mid-October.

Further improvements and alterations are in progress in the Gardens. Work on the old Rose Walk mentioned last month is nearing completion, after much hard work building up the ground on the lower side to maintain the level. On Battleston Hill a large plot of ground near the Daffodil Trials is being prepared by deep digging and a liberal dressing of spent hops to receive the comprehensive collection of Kurume Azaleas at present growing in the nursery at the foot of the Hill. Work has also commenced on the Portsmouth Road Field with the planting of Japanese Cherries which it is hoped will prove an outstanding feature of the Gardens in the years ahead.

THE GARDENER LOOKS AT HIS FLOWER VASES

By John Adams

THE gardener must look with dismay at his diminishing stock of pottery for flowers in these difficult times, and the potter can do very little about it while exports are so important. The time must come eventually when larger supplies of pottery of the kind used by gardeners will be available in this country. Austerity cannot last for ever, and our present difficulties are borne more cheerfully by anticipating the pleasures of a normal civilised life. A commentary on this type of ware may be useful for reference. Pottery for gardeners includes vases for flowers, bowls for bulbs, fruit comports, the shapes known as posy bowls, posy rings, and posy strips, wall pockets, decorative shells for short-stemmed flowers like primroses, and many others. The rings and strips enable one to arrange odd sprigs and single flowers as decoration, and so make a mosaic of colour without seriously robbing the flower beds. They are also used as table decoration, being worked into simple geometric arrangements with candelabra and small figures, sometimes reflected in horizontal mirrors in the centre of the table, or in shallow water in floating flower bowls. This form of table decoration is apparently more popular in the U.S.A. and the Dominions than with us.

The wall pockets serve a useful purpose in getting round a modern architectural austerity. In many flats the architect provides a mantelpiece only a few inches wide and the furniture space is restricted, so the flower pocket is hung on the wall, and it can be very decorative. There are also vases rectangular in section and a few inches wide specially designed for niches and narrow spaces. Many gardeners enjoy having single blooms from favourite shrubs indoors, and the narrow mantel-ledge will hold a small vase for this purpose. When the weather is unpleasant outside, the companionship of rare and adventurous winter flowers consoles us with the thought that " if Winter comes, can Spring be far behind ? " At last when spring is here the vase might hold the daffodil that comes before the swallow dares, a daffodil of glistening white stained with the palest arctic green, and a sculptured perianth as perfect in its refinement as a Greek masterpiece in Pentelic marble.

While some of these pieces do not pretend to be great art they have their legitimate uses. One disregards the flower blocks which are put inside bowls to hold the flowers in position, as a really satisfactory one has not yet been devised either in pottery or glass. Those made of twisted strips of lead are better. As a potter I make this confession reluctantly, but the truth must prevail. The badly designed and crudely coloured gnomes, pixies, toadstools that wee fairies are supposed to sit upon in the hours of darkness, and other sweet fancies which make a nightmare of some semi-detached lawns, are occasionally made of fired material. We will have none of them. They belong to the Quaint family, and take their place with sentimental verses carved on garden seats. The best that can be said of them is that they are fun. There is wisdom in the lazy and deliberate wit of the American negro comedian who said, "Boy, even if that was *good* I wouldn't like it."

As most people know there are three main types of ceramic material, earthenware (also called pottery or faience), stoneware, and porcelain (sometimes called china).* Each has a different individuality, and requires a different æsthetic approach to suit the special character of the material. The barbarians in recent years have standardized the use of the word crockery, by which they mean not only the rubbish offered as prizes at a hoop-la stall, but also pieces made by our greatest potters, and unfortunately, like certain garden pests ones tries in vain to get rid of, the word seems to be establishing itself everywhere.

The most satisfying wares to put flowers in are probably high temperature stonewares, rather solidly glazed in quiet and even sombre tones having subtle clouding, spots and striations, and an exquisite quality that is a delight to feel. Arnold Bennett said that a potter in a restaurant always gives his craft away by lifting up the plate to see who has made it. I believe it is because he is unable to keep his hands off his material. A connoisseur of fine wares judges the quality of the glaze surface as much by touch as by sight, and a fine surface is as important as fine form or appropriate decoration. If the clay (or body) of which the pot is made is regarded as the bones and the beak, then the glaze and decoration are the fur and the feathers, although a glazed surface is not absolutely essential. A pot in a vitrified common clay, flashed and speckled in the flames of the open kiln, makes an attractive receptacle for the more homely and familiar flowers. The nearer one keeps to simple straightforward methods the better it is; the more one forces the material beyond its natural character the worse it is. As CHARLES KINGSLEY says in one of his worst lines, "Be good, sweet maid, and let who will be clever."

A pot should act as a foil to the flowers and not compete stridently with them. The ideal surface is the entrancing silkiness of the Chinese stonewares of the Sung and Yuan Dynasties, and the more reticent wares of old Korea with their nostalgic appeal. Gardeners will be interested in the fact that a good proportion of those glaze mixtures was composed of vegetable ashes. Almost any material that contains silica, alumina and alkalies when it is burned is suitable, from garden rubbish to oak, and the ashes of different materials give varying effects. A nurseryman friend once gave me a load of *Rhododendron ponticum* logs six inches thick, and the ashes made a fine stoneware glaze, finely clouded and spotted. One or two English pottery manufacturers before the war achieved a measure of these semi-reflective surfaces at the lower temperature of earthenware, and in different materials. In parenthesis let it be said, even if it humbles the scientific mind, that chemically pure materials and the engineers' devices for closely controlled firing do not give the unexpected and thrilling effects of pieces made by more empiric methods.

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* See page 473 for description of the three main types of ceramic material.

Many of these pieces, however, from the studio and the factory, harmonize perfectly with the tones and colour values of flowers and foliage. The reason is that such glaze surfaces do not imitate nature, but rather interpret her. They are the essence of the visual qualities that are in nature, recalling the sheen of leaves, the markings on fruit, feathers, and birds' eggs, the bloom on ripe plums, the play of light on polished stone, wet pebbles and finely figured wood, the sombre dignity of bronze and the luminous off-white shadows on virgin snow. This is not imitation. It is not altogether romantic fancy—the faery lands forlorn and all that, with the horns of Elfland faintly blowing. Some element of poetry does light it up and make it exciting, but the fundamental basis is the same in all great art, æsthetic perception and the right use of material.

The dividing line between imitation and interpretation can often be very fine indeed, like that which is said to divide precariously genius from insanity. GEORGE ROBEY singing " The little pigs lie in the best of straw " with its humorous porcine noises is akin to genius, while little sister braving the bombastic fury of " The Battle of Prague " on the piano is merely boring. These things are of the mind and the spirit. Slavish imitation is seen in bulb bowls having relief ornament copying oak-grained staves bound with metal hoops, or roses lithographed on vases complete with drops of dew. SAMUEL JOHNSON said the last word on imitations. If his statement is repeated aloud in pontifical imitation of the learned doctor, it will be a fitting end to this paragraph—" Sir ! a dog could doubtless be made to walk on its hind legs like a man, but would it be a better dog if it did ? "

That steers us safely past all photographic and imitative tendencies. If decoration is used at all it should be used sparingly. There is always someone who on rare occasions will attempt to ignore the general principles, and a vase covered with a restless arabesque pattern, or a bizarre shape, or even one in an aggressive colour may be arranged with flowers with what appears to be fair success by those who know how. It would be rather like watching a daring trapeze artiste when one is thankful that the net is spread safely underneath. Such blithe spirits, however, much as we admire them, are less to be envied than those exquisitely refined gardeners we all know, who twitter about " soft shades " and express a spinsterish horror of the colour they call magenta. There is no need to stretch the net tightly under them. They walk no giddy tightrope, for they tread a terrestrial line of their own choice with charm and safety. They are let down neither by the old Spode jug from the dresser nor by the peasant pot bought from the pavement of a Grande Place somewhere in Normandy for a few francs, when francs were francs so many years ago. They view with shocked surprise the gay sophistication of the flower displays in the windows of a Bond Street scent shop. For them the country bunch.

The throwing wheel always has been, and perhaps always will be, the best means of shaping pots of character for flowers. The potter is mentioned in the early chapters of the Bible in some magnificent phrases, alive and moving, which are as true now as they were in that remote patriachal age. To-day throwing is responsible for a minute proportion of the national output of pottery, so beware of imitations as the advertisements say. Good brushwork, too, has individual character, and is vastly different from Victorian china painting. At its best it is full of feeling and is as tense as the cut of a surgeon's knife. At the present time several English factories and some studio potters with varying points of view reach a high degree of skill in the direct use of a brush. May it long be so !

I have kept the discussion of the merits of porcelain for flowers until the last. It is the most precious and at the same time the most difficult ceramic material. In speaking of true porcelain one does not include those less well bred, but more plastic mixtures which are halfway to stoneware, and which fire a pale greyish or yellowish white. A quality potter would understand the distaste that some lovers of plant species have for hybrids. To the purist hybrids are a swing to the left in the direction of the bend sinister, a contamination of the blood royal ; though gardeners and potters alike indulge in curious inconsistencies. A well-known Cornish connoisseur of rare species, who was at the same time a breeder of attractive hybrids, declared that while he could not bear other people's bastards, he was very fond of his own.

Porcelain is perhaps more suitable for fine tableware and figures than for flower vases. I am open to correction that this is not so, but I am unable to recall many outstanding examples, though blue and white porcelain, beloved of WHISTLER and the Pre-Raphaelites, can be superb if it is of the right kind of blue. Its loveliest quality is its pure, translucent whiteness and this is hardly the best general background for flowers, though it can be coloured with mineral oxides. Nevertheless it has its limitations. As its raw materials lack sufficient plasticity, it cannot be thrown freely on the potter's wheel, and this must result in shapes lacking the human freedom and variety of stoneware and earthenware. I am prepared to agree that in the hands of an enthusiastic experimental potter these factors could be adjusted, and porcelain might be persuaded to give its superb qualities more completely to the service of the flower lover ; though one suspects that the commoner plants would always appear uneasy in its rather superior company, and that nothing less exclusive than the orchids of a millionaire arranged by an Edwardian duchess could stand up to its aristocratic charm. I am told that a belief in quality in people and things is rather naive and is now out of fashion, but let it pass—the wheel will turn full circle in its own good time.

What the right answers are I do not pretend to know, though it would be intriguing to try to find out. One thing at least is certain. Stout CORTEZ, when with eagle eyes he stood upon a peak in Darien, would not be more on top of the world than a potter setting out on such a quest. Gazing across the uncharted coast he could jolly himself that he might be the first, as the poet says, that ever burst into that silent sea, and in these times of frustration, what greater happiness could any man in his senses desire than such an illusion ?

EARTHENWARE, STONEWARE, AND PORCELAIN

Earthenware

Faience.—Usually made of a common clay firing white to dark red, at about 1000° C. Plastic.

Types.—Peasant wares and most of the early historic wares, such as Italian Maiolica, Delft, etc.

Earthenware.—Developed chiefly in England in the eighteenth and nineteenth centuries, firing up to 1180° C., white or tinted, being mixtures of china clay (Cornwall), ball clay (Dorset or Devon), silica in the form of powdered flint, and Cornish stone as a flux. Reasonably plastic. The basic material for most English commercial wares.

Stoneware

Various mixtures of natural clays and fluxes; plastic. The fired colour is grey to cream and buff. Translucent in thin pieces, and in some examples approximates to a rougher type of porcelain. Temperatures approximately 1250° C. to 1320° C.

Porcelain

Continental (felspathic porcelain).—Mixtures of white-burning clays and fluxes, usually kaolin, felspar, and quartz. Lacks plasticity. Translucent white. Temperatures 1350° C. to 1450° C.

English (Bone China).—Mixtures of kaolin and clays from Devon and Dorset, flint, bone ash, and Cornish stone. Temperatures 1280° C. to 1300° C. Has some plasticity. Translucent. Has a soft waxy quality, and is preferred by many to felspathic porcelain on that account.

PITFALLS OF THE AMATEUR FRUIT GROWER

By Raymond Bush

(*Lecture given on October 7, 1947*: Prof. T. WALLACE, D.SC., *in the Chair*)

THIS is intended to be a talk to amateur growers, but it is a popular mistake to regard the term "amateur" as meaning someone who is not skilful. Now one need go no further than the sort of exhibit which that notable amateur Mr. HOWARD CRANE can put up to realise that the amateur can be so skilful that he will put the professional grower's nose completely out of joint in everything except quantity. As a retired commercial grower I take my hat off to the skilful amateur and confine my remarks to the inexperienced amateur.

I make the statement after considerable thought that the amateur gardener with fruit in his garden could, as a rule, treble the amount of fruit which he grows simply by attention to pest control.

SITE

The first pitfall for the amateur is trying to grow fruit in a low spot where spring frosts will play havoc with his fruitblossom in April and May. This may mean losing the crop four years out of ten. You cannot move the site of your garden and house, but if you are looking for a new spot to live in try to choose one on a rise rather than in a hollow. In the garden, too, a rise of a few feet may make all the difference. If you *must* plant fruit in low-lying places choose varieties which are known to be resistant, either by late blooming or by some inherent quality.

UNDERESTIMATION

If I had to name the most common pitfall for the unwary fruit-grower it would be Underestimation of the Difficulties. Many people seem to think it is dead easy to grow fruit. It may *seem* easy, as my friend the late Editor of the *Countryman* once wrote about apple-growing: "There is no mystery whatever about it. It is simply a matter of growing the right fruit on the right stocks, planted in the right way in the right soil, on the right site, pruning in the right way and hoeing in the right way, picking and packing it in the right way, and either storing it in the right way or marketing it in the right markets. Merely that? Not at all. There is also spraying at the right time with the right stuff three or four or more times a year."

SIZE OF GARDENS

Fruit gardens or the spaces in which fruit can be planted vary very much in size. I myself have grown Strawberries on the roof of a flat in Gray's Inn and on the wide and open spaces. I have admired a Tomato crop in the East End of London growing from a basement window box and Persimmons growing in the garden of a Jersey Manor House. We have the very small and the very large grower. Walled gardens of mansions and now pre-fab gardens with no more than a wire fence. The man with plenty of room can plant something of everything, but the man with the small garden must make the most of his space and choose wisely. The nurseryman's catalogue will tell you what you may hope to get if it is not already sold out. But avoid the pitfall of making up your mind in October what you would like to plant in November. Order a full year ahead and there may be a chance of your getting it.

VARIETIES

Varieties offer many pitfalls, so see what your locality grows well and experiment slowly. You may have noticed that each war has shortened the list of varieties of fruit offered in the nurseryman's catalogue. I have a list of a nursery which still exists in Somerset. This list is a large and well-bound book, published in 1872. From this you could order any one of over a thousand varieties of Apples, eighteen hundred Pears, over four hundred Plums, two hundred and thirty Cherries, a hundred and twenty-two Gooseberries, and even eighty-eight varieties of Strawberry.

To-day you can divide those numbers by anything from fifty to twenty. So I suggest that in fruits such as Apples and Pears you order and plant what varieties you fancy and if they do not come up to your expectations then learn how to graft and change them over to the sorts which experience has shown give you crop and quality. No fruitgrower, who cannot graft a tree, is getting half the fun he might out of fruit.

Given his head the amateur will usually order and plant the *choicest* fruits. I am continually being pestered by people who want to buy one Peach tree and cannot get it locally. Recently, however, a lady wrote me from India saying that she was coming to England and was determined to plant a ten-acre orchard of Peaches and could I tell her where to get the trees from ? Now I would not wish my worst enemy a ten-acre plot of Peaches to look after as an introduction to fruitgrowing. Nor would I recommend any amateur to-day to imagine that it is simple, easy and economic to jump into fruitgrowing on an acreage basis.

We all know that 'Cox's Orange Pippins,' 'Doyenné du Comice' Pears and 'Coe's Golden Drop' Plums are unique in their individual excellence, but if one planted out an acreage of these three—with of course the necessary pollinators, it is unlikely that the returns in crop or cash would be as heavy as from 'Worcester Pearmain,' 'Conference' and 'Victoria.' Admittedly the amateur is not handicapped by the same considerations as the commercial fruitgrower. He is not catering for a palate which has decreed that eating Apples must be red and cooking Apples must be green, but can put quality and flavour before appearance. Even so to plant out several 'Cox,' 'Comice' and 'Coe's Golden Drop' to the exclusion of quite fair quality varieties which are known to be good and consistent performers is a mistake. To some extent also his choice must be determined by his spraying or lack of it. Some varieties are very sulphur-shy notably 'Cox' among Apples and 'Comice' among Pears, yet spraying must be undertaken to control scab. 'Williams' Pears too, excellent in September, are very much more prone to scab than 'Conference.' So I suggest a few of the choicest varieties, and, if they do well, graft over the less good to better types.

POLLINATION

The correct choice of suitable varieties for ensuring pollination need offer no trouble to-day. Mr. M. B. CRANE's *Fertility Rules in Fruit Planting* are very easily understood, but where a solitary tree is some distance away from a likely pollinator I have always found that one can set its fruit by suspending among its branches a tin can filled with water into which from time to time the flowering branches from other varieties are put. These will need replenishing about once in the flowering period. I do this successfully with a solitary row of 'Cox' cordons deliberately planted with no pollinators.

PLANTING FRUIT

It is a mistake to keep fruit trees lying about in the straw packing in which they arrive. Mice can do much damage to roots and stems unseen. I like to choose a patch of soil well away from hedges and suchlike mouse harbours and cover it deeply with old rubbish, hedge trimmings, straw and so forth. Then the frost is kept out of it and if the trees come in a really cold spell the rubbish can be pulled off and the trees be unpacked and the roots heeled in at once to recover some of the moisture which they lost on their rail journey.

It is a serious pitfall to plant fruit—especially soft fruit—in dirty ground. Deep rooting perennial weeds should not be allowed in any land which is to grow fruit. Thistles, Docks, Nettles, Ground Elder and Convolvulus are anathema to every gardener and once soft fruit is overrun with the last two it is a terrible job to get it clear again.

Annual weeds do not matter a bit, you can let them seed and dig them in for humus, but the perennials must be dealt with before planting. They can be if you are prepared to let your soil lie fallow for six months. This means that the killing must be undertaken in May if you wish to plant in November. The weed killer to use is sodium *chlorate* and do not mix this up in your mind with sodium chloride which is common salt. Do not forget also that the chlorate is extremely inflammable, while the chloride has some fire extinguishing properties when the chimney catches fire.

Last autumn I watched an amateur who had invested in a large house and garden and was preparing to rescue both from the dilapidations of the war. The garden was in a terrible state. He was cutting up a huge patch of Ground Elder into ten million pieces with a power cultivator. Into the resultant mixture of chopped root and leaf he was planting all manner of soft fruit from Strawberries to Raspberries. "What comes up after," he explained, "I can easily cut off with a hoe." What a hope! That particular pitfall was so deep that he will never climb out of it, yet sodium chlorate would have saved him.

In addition to sodium chlorate there are to-day selective weed-killers of the Hormone type which overstimulate certain weeds and we may find that careful spraying and wetting of their leaves is enough to dispose of such hardy types as Ground Elder and Convolvulus. Its effect on Dandelions, Buttercups and Plantains is magical. If so, the delay in planting between application and planting time may be much reduced.

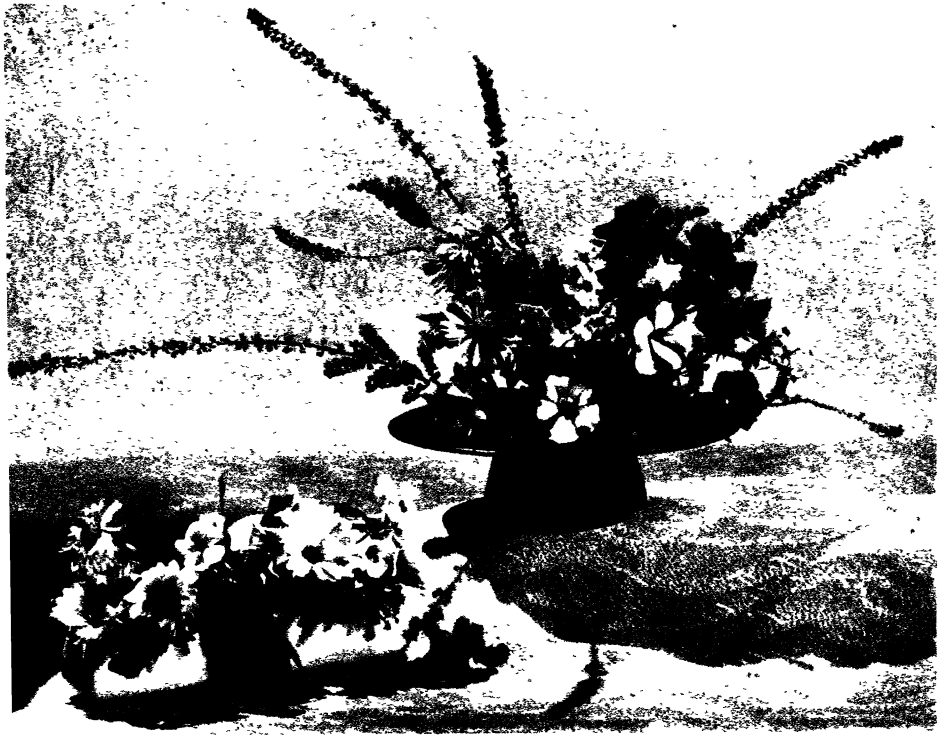
A major pitfall in planting fruit trees lies in planting too deep. If planted deeper than the point at which the scion or bud joins the stock there is a danger of scion rooting and if this occurs the dwarfing effect of the stock may be wholly or partly lost. At the same time this danger can at times be turned to the gardener's advantage, for a tree on a dwarfing stock which is obviously failing can often be resuscitated by heaping the soil around its stem to encourage scion rooting. In the ordinary way the union should always be just above soil level.

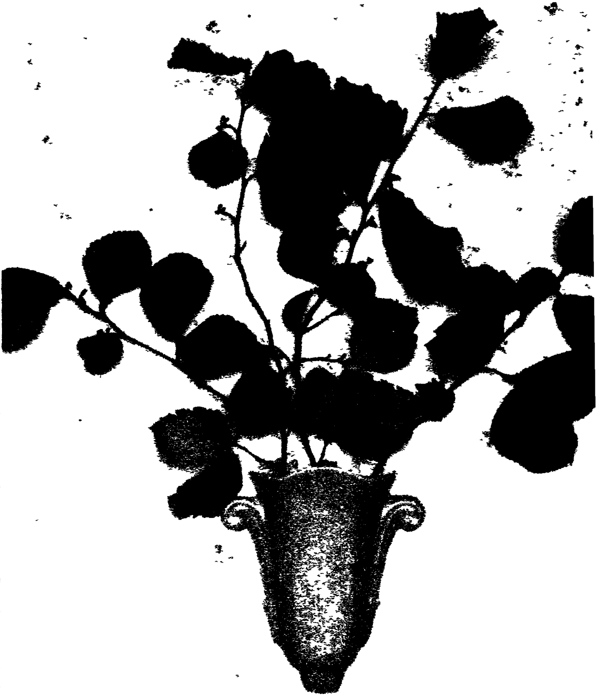
SOIL TYPES

I do not propose to make pitfalls for you over soils. You will make and mend those for yourselves. We all know how soils differ and how often an envied neighbour must have all that we have missed. Some of us have deep loams, useful or deplorable clays, flinty soils, gravels, good or bad sands and so forth.

MANURING

There are definite pitfalls in manuring. In August during the drought I was shocked to see what a farmer friend had done to a mixed



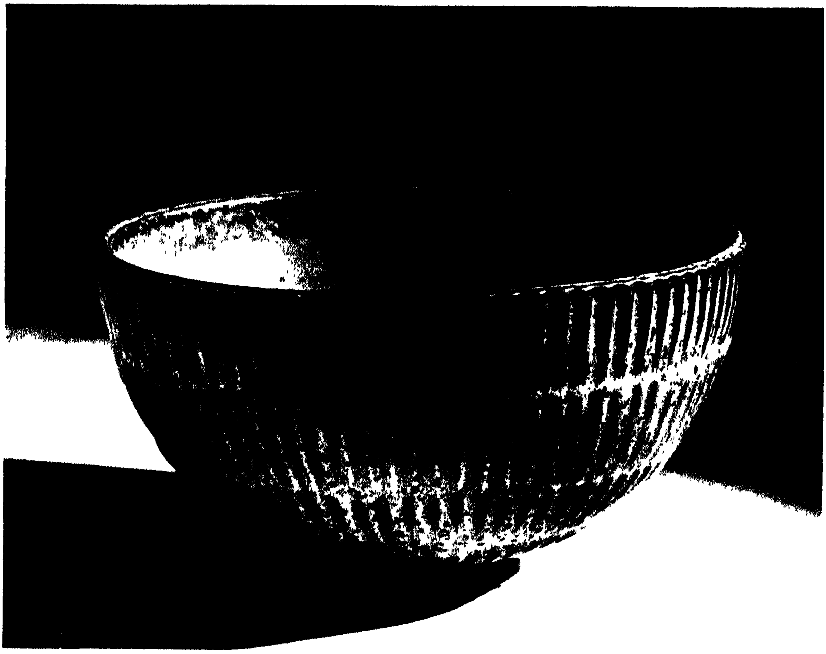


John Harris *Designed by Truda Carter*

THE GARDENER LOOKS AT HIS FLOWER VASES

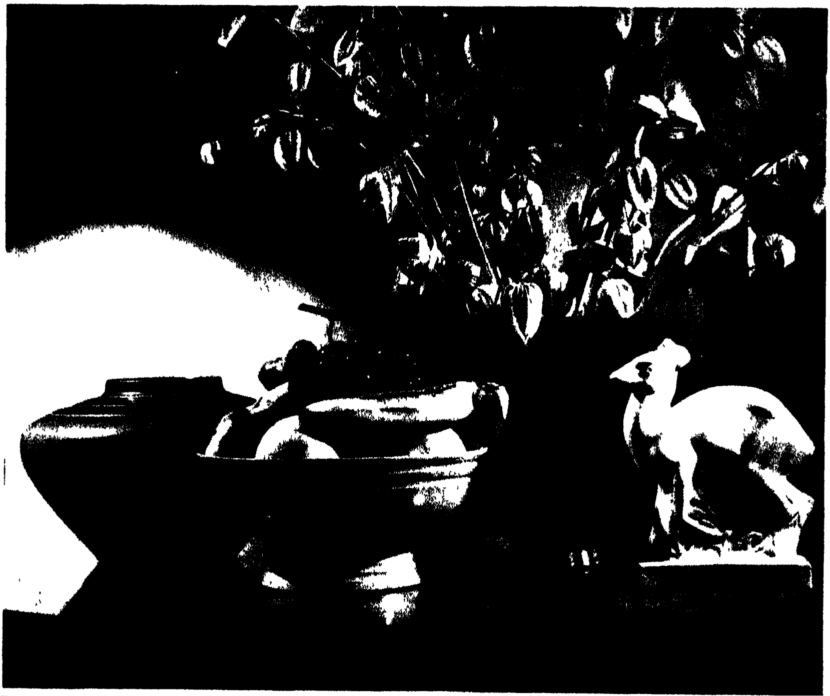
FIG. 170—Posy strip and posy bowl Earthenware. Poole pottery

FIG. 171—Wall vase. Earthenware. Poole pottery



Designed by Arno Malinowski]

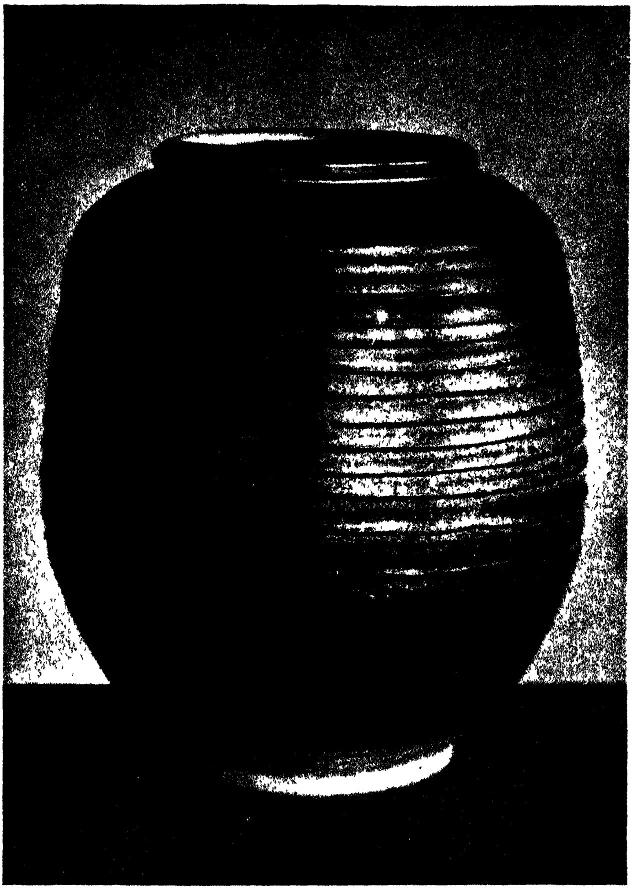
Fig. 172 Fruit or bulb bowl. Stoneware. Royal Copenhagen



Designed by Keith Murray]

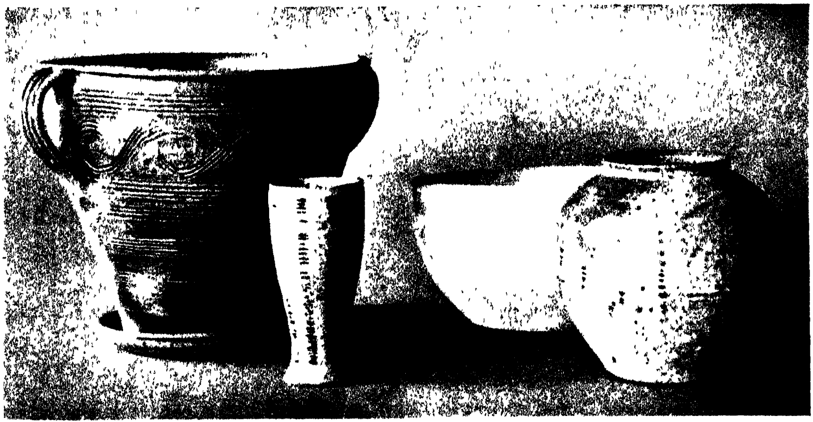
THE GARDENER LOOKS AT HIS FLOWER VASES

Fig. 173—Vases and fruit bowl. Earthenware. Wedgwoods



Designed by Norah Braden   By permission of the Victoria and Albert Museum

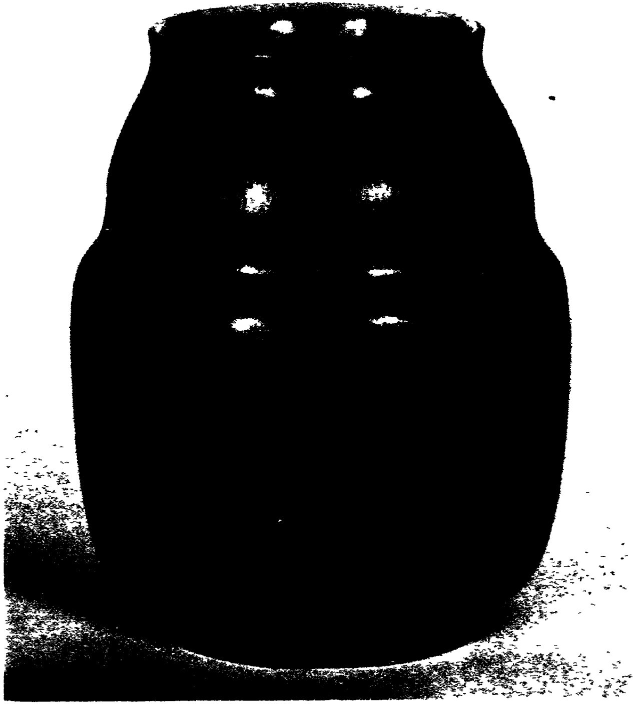
FIG. 174—Stoneware pot



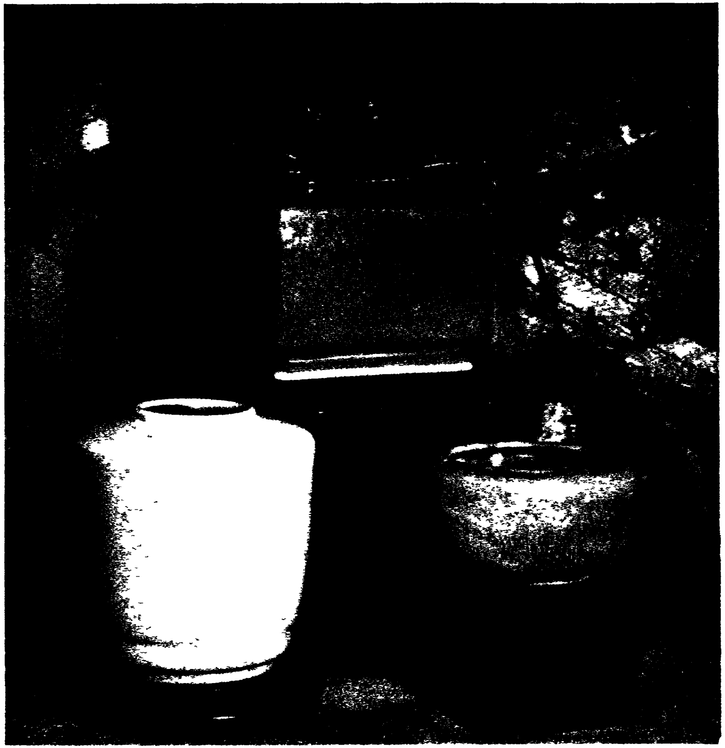
Designed by Katharine Pleydell-Bouverie and Norah Braden. From "English Pottery Old and New" By permission of the Victoria and Albert Museum]

THE GARDENER LOOKS AT HIS FLOWER VASES

FIG. 175—Vitrified unglazed pottery



Photo, John Harris



Designed by John Adams, Truda Carter and Harold Stabler]

THE GARDENER LOOKS AT HIS FLOWER VASES

FIG. 176—Poole stoneware. Glaze made chiefly of *Rhododendron ponticum* ashes

FIG. 177—Poole stonewares

Photos, N K Gould

STORM OVER WISLEY

Figs 178 and 179—Paths showing erosion due to the storm

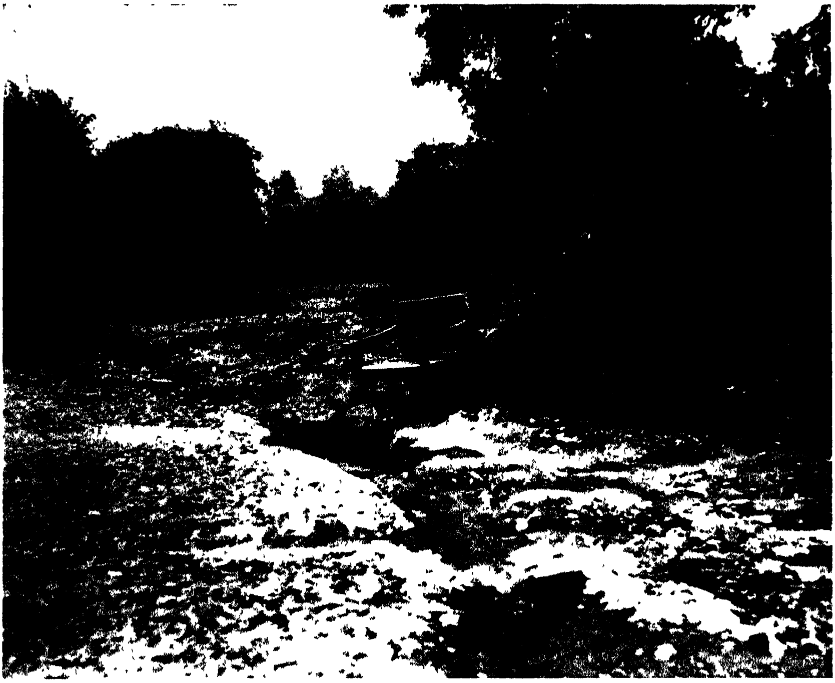
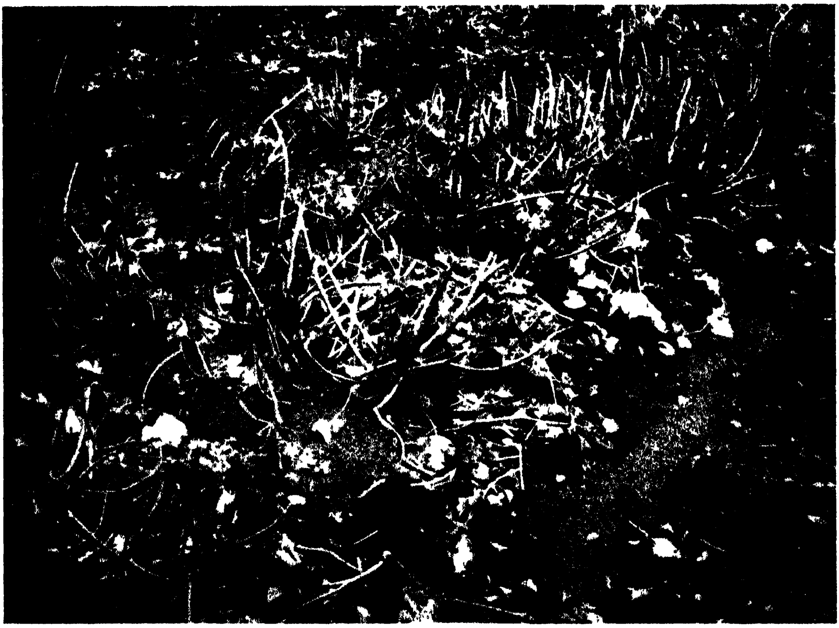
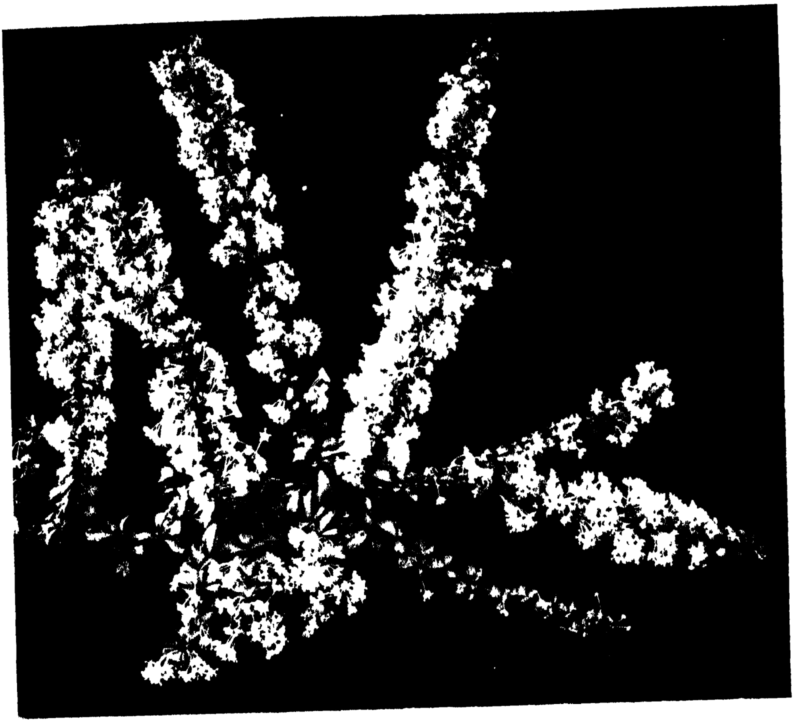


FIG. 180—A crater in a path near the Floral trials



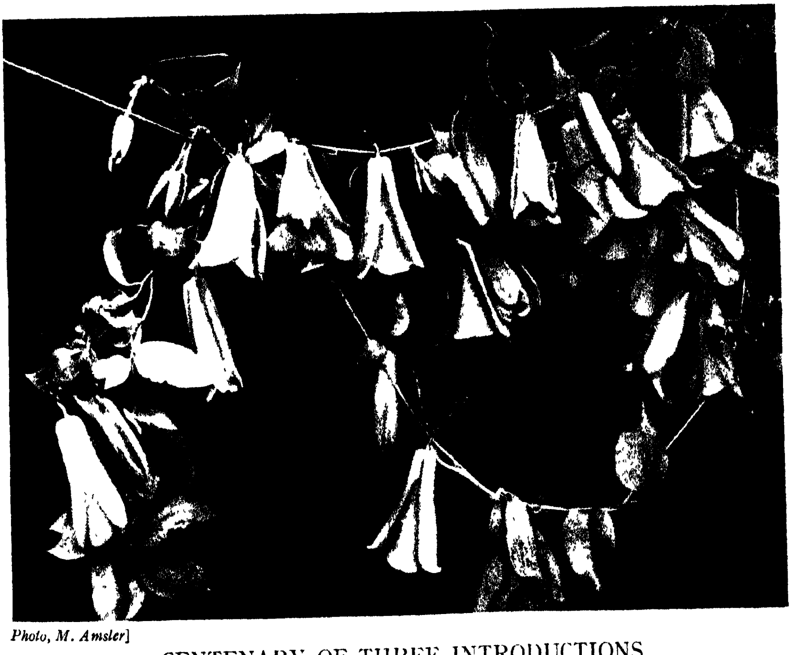
STORM OVER WISLEY

FIG. 181—The damaged Nasturtium trials



Photo, C. P. Raffill]

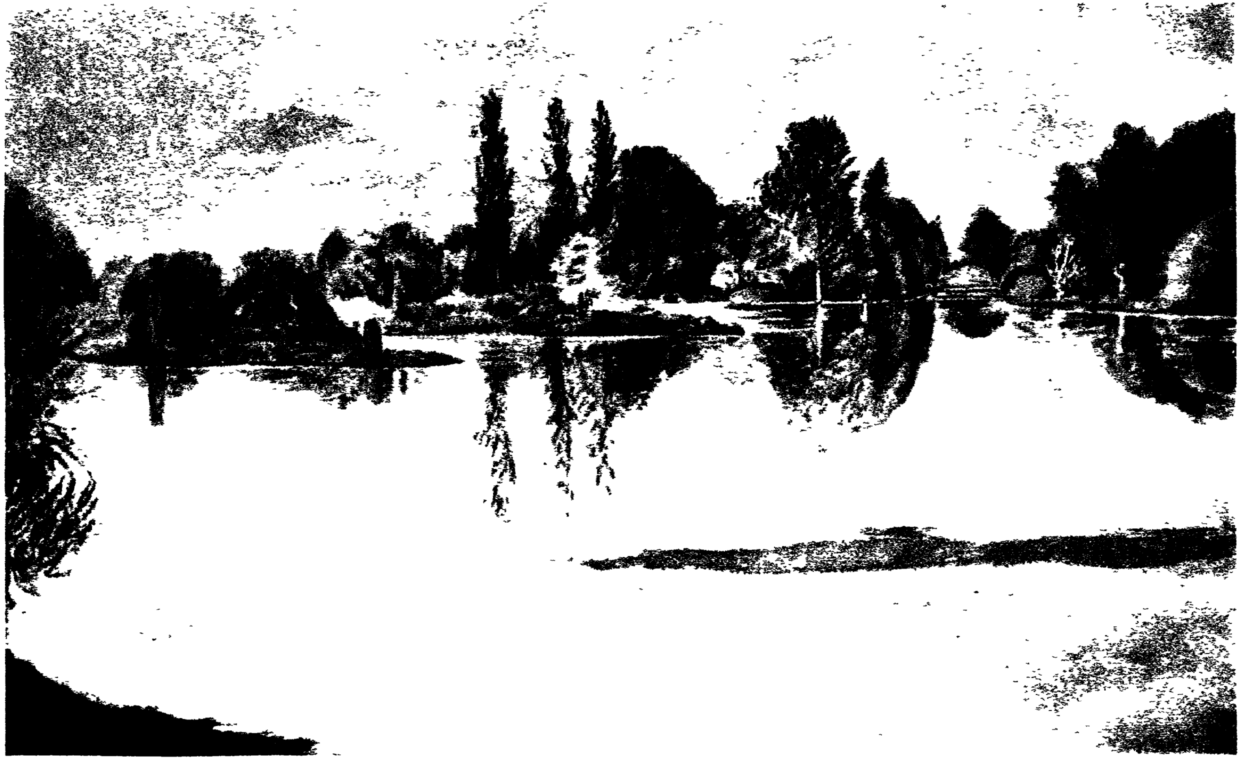
FIG. 182—*Ceanothus rigidus* (See p. 485)



Photo, M. Amsler]

CENTENARY OF THREE INTRODUCTIONS

FIG. 183—*Lapageria rosea* (See p. 486)



Drawing by A J Wise

STORM OVER WISLEY

FIG. 184—The lawn in Seven Acres immediately after the storm

patch of Cabbage, Kale and roots grown for his few cows. He had broadcast a mixture of sulphate of potash and sulphate of ammonia right across the tops of the plants. As a result wherever the fertiliser fell it had scorched great patches from the green leaves. He said that he was sure it was going to rain and he wanted to get the manure on. Much better wait till it is raining fast if you want to broadcast such manures.

I have seen much damage result from sowing sulphate of ammonia into the crowns of Black Currant bushes and down Raspberry rows. The feeding roots are always some little way out from the plant. A circle of manure outside the spread of the branches of a tree will give a quicker response than a heavy dose close around the stem.

It is grave mistake to scatter artificial manures into the holes dug for planting fruit bushes or trees. I have seen hundreds of Black Currant bushes killed because the planter had some soot handy and thought a handful or two would help them along. Young Apple trees also can be killed or damaged when sulphate of ammonia or sulphate of potash is thrown in the hole at planting time so that the roots come in contact with it. Roots of young trees are in no condition at planting time to take up and use soluble manures *via* the root. The best manuring for newly planted trees and bushes is a mulch of compost or old manure spread around them. The winter rains and the activities of worms will take down what soluble food there may be in good time to stimulate spring growth.

Once growing or fruiting, the trees can be manured gently as they need it, but it is better to manure with brains than with bags of dried blood or fish manure or even mixed fertilizers.

When using artificials, water is needed and if not in the soil at the time of application, trees can be assisted with watering. Heavy watering is far better than a mere splash and a good plan is to draw out a trench around a tree or along a row, let it have as much water as will soak away and having done the irrigation, pull the loose dry soil back over the trench to reduce evaporation and cracking.

OVERCROWDING

This is a very common pitfall. The would-be fruitgrower cannot bear to see open ground but must cover the area at all cost. An adviser of this Society told me of an amateur who asked him in to suggest how best to plant the Apple trees he had bought. These consisted of twelve very strong-growing standard trees such as Bramley and Newton and twelve bush Apples on semi-dwarfing stock. The land available was 74 feet long by 24 feet wide. The commercial grower would plant just two of the standard trees on that space and expect them to fill it in twenty years time. If you want plenty of variety, stick to dwarfing stocks and plant and train them as cordons or dwarf pyramids.

Many amateurs having planted their fruit trees or bushes on the close side to start with, proceed to fill up every foot of open ground around them with vegetables. This is greediness and also it will retard the growth of the newcomers. Space means light and less competition for water, both of which are factors which vitally affect growth.

Before I knew my soil I planted in my garden a patch of Black Currants 4 feet apart. After three years my wife objected to forcing her way in on all fours to pick the fruit, so I took out alternate bushes in each row leaving them at 4 feet by 8 feet. This year I had to tie up each bush as it was picked so that one could get at the next one. If I thin them to 8 feet apart, as I intend to do, I shall probably get just as much fruit. There are many soils, however, which under wrong cultivation will never grow a sizable black currant bush.

Then the Raspberries. A very tempting pitfall. Beginners just cannot bear to see six feet of open ground between the rows. In goes a row of Peas or two rows of Parsnips. There comes a dry spring and summer, and a note from the water company to say that hoses must not be used, and the two crops are spoiled. If you *must* intercrop your Raspberries plant really wide, manure the crop you put in and be prepared to irrigate.

EARLY CROPPING

A minor pitfall is the determination to grab a crop the first year of planting from Currants or Raspberries, You may get a few undersized fruits from the unpruned canes and shoots but at the sacrifice of vigour for next season's growth. To snatch at the illusion for the reality is to imitate the dog in AESOP's fable which dropped its bone in the stream to make sure of the reflection as well. If you know your soil, and can plant your fruit trees within a few hours of their being dug from the nursery you can crop the first year of planting. I have done so quite successfully, but once the root hairs and fibrous roots get dried out, as they will in a few hours, they will have to be replaced by new growth before the tree can begin its new life.

OVERCROPPING

Overcropping a fruit tree is greediness, and often means going without next season. What the amateur should aim at is so to manage his soil's fertility and his trees that they *can* crop enormously each year, yet do so well within their capacity and without undue exhaustion of their reserves of food.

You will at times see Plum trees carrying far too many fruits. The main branches having bent with the growing weight, break and the trees are spoiled. In commercial orchards I have seen big trees of the Plum 'Belle de Louvain' with not only the branches but trunks split right down to the ground with a glut crop. That sort of thing is unnecessary, though it seldom happens in the garden. Plums are meant to crop enormously, but to do so they must be shaped by pruning in their early years to withstand the weight of a big crop, and if that is not enough they must be thinned out and the branches propped or strung up to a central pole.

To let a tree grow to suit itself is a pitfall. Many top fruit trees make awkward beginnings. First branches should be well spaced out and not allowed to spring from a crowded crotch. Where two branches divide in an acute-angled V fork an inherent weakness is set up which will later result in breakage when the pull of the heavy crop comes along. If instead of the V fork the one branch leaves the other at right angles or nearly so a very strong, weight-carrying branch is provided which will never break at the join.

At times I have rectified such V dangers by screwing strong eye bolts right through large limbs with a washer and nut to finish and running strong wire between them. In one orchard I used several miles of wire and many hundreds of foot-long bolts to prevent wholesale breakage. Some of the reinforced trees picked over a ton of Apples apiece that year, and this year the manager tells me that numbers have picked over sixty bushels, and one sixty-eight. There are fifty-six bushels to a ton, so that with sixty-eight you can get some idea of what a really big Bramley in the commercial orchard may be called upon to carry. One can do the same thing on a small scale in the garden to Plum and Apple trees simply screwing into the limbs small screw eyes and running a length of galvanized wire from eye to eye so that each branch supports its opposite number.

PRUNING

Pruning is a regular tank trap and demands several talks to itself. The beginner is always wanting to know how many buds to cut to, or which bud to cut to. What a happy man the jobbing gardener must be, he comes along and cuts every fresh growth back to a hat peg. He will do just the same next year, and any crop that comes along will be a surprise for him.

There are no hard and fast rules for pruning. Many amateurs prune their young trees not enough and their old trees too much. Trees can be grown in all manner of shapes. If you restrict their tops and do the same for their roots, they are singularly accommodating, but if you cut the top too hard it may take many a long year before you pick as much fruit as you hope for.

Some trees as they get older droop down in regular curtains of fruit. Old Bramleys, Blenheims and even well-cropped Cox standard trees do this. This bend is the fruiting habit and once established, cropping should be regular and heavy. The amount of fruit which a tree can carry is in ratio to the amount of light which its fruiting branches can receive. A branch heavily shaded by another will eventually die out.

Old and crowded standard Apples can be renovated by careful thinning out. If you stand beneath such a tree and look up into its centre or dome you will see a certain amount of dead wood, a great deal of half alive wood and overlying this, an active covering of bearing wood carrying leaves, fruit and fruit bud for next year. If you cut out the dead wood and remove the half dead, and limit your bearing wood to an outside layer of about eighteen inches in depth you can secure the maximum crop from that tree.

It will in shape be rather like an umbrella with the cover of leaf overlying the ribs of branches. You can, on the other hand, take your umbrella, turn the ribs upwards, remove the cover and grow fruit all along the ribs down to the junction of the limbs with the trunk. This type of tree is the familiar spur pruned tree with a dozen or so limbs all reaching out as individual cordons.

Time does not allow me to stay too long on the subject of pruning, but it is a fact that more fruit is lost by unwise pruning than by letting the tree alone and merely regulating its density by the removal of an occasional big branch.

Close spur-pruning is to-day confined to the garden. The commercial grower aims at a fountain of new replacement growth rather than a permanent framework of elderly branches.

Where space allows the amateur might often with advantage allow his trees to grow bigger instead of trying to keep them to a uniform size and shape by hard pruning.

SPRAYING

Failure to spray is a real pitfall. Spraying is an exact science and no liberties are allowed to the beginner. He must do what he is told or pay the penalty. I have had letters like this : " Dear Sir,—Following your advice I this year sprayed all my apple trees three times with winter wash to make sure that all the eggs were well wetted. As in June the leaves seemed rather poor and spotty, I sprayed with lime sulphur, using it rather stronger than your tables advised. As a result, all my leaves and all the fruit there was has fallen off. What do I do now ? I think you really ought to be more careful how you advise, etc., etc."

There are plenty of sound and reliable spray programmes available, and once these are followed the results are so gratifying that spraying becomes a pleasure. Several amateur friends have been thrilled by the crops which resulted from their spraying, and the sight of clean fruit for the first time has opened up new vistas of achievement.

Spraying is of course much easier for the man who is always at home than for the city man who only comes home at nights and for week ends. It is an advantage to be able to pick the best weather for the job.

If you can only be bothered to apply one spray in the year, then a winter wash containing D.N.C. (Dinitro-ortho-cresol) is preferable to Tar Oil. Do not spray your Strawberry plants with this, but spray all other fruits with the exception of Figs, using the recommended dilution and spraying at the right time of bud development.

If tar-oil wash is used it will kill the eggs of greenfly and apple sucker and will abolish the scale insect which is now only found in private gardens. The winter wash composed of petroleum oil and D.N.C. will do more since it kills red spider eggs and also the eggs of capsid bugs which attack Apples, Pears and Black Currants. It may also reduce the number of fertile winter moth eggs, and of course it also controls greenfly and apple sucker.

Never spray winter wash on to green leaves of plants beneath trees or bushes. You can protect any nearby vegetables by covering them over temporarily with split sacks, hessian, or your old black-out curtains.

To grow clean Apples and Pears in a wet season or indeed in any season, you must spray against scab with a fungicide. You can safely use lime sulphur up to the time blossoms open. After that some varieties are sulphur shy and for these you can use the less caustic soluble sulphur washes. Never on any account apply a first lime sulphur spray after blossom. If you do, you are likely to lose leaves and fruit on several varieties. To use lime sulphur consistently throughout the season, the tree *must* be acclimatized to it. With the first application, the tree receives a sulphur shock, and provided that this occurs before blooming, no damage results, but if the sulphur shock is not registered before blooming, a first application which is made at the petal fall or any later stage will cause leaf fall and fruit fall. That is a good reason for either applying a full spray programme or else being content with a winter wash alone.

To any wash mentioned you can add DDT which is an immensely powerful caterpillar destroyer and also fully effective against apple-blossom weevil applied at the right time. Never underestimate the caterpillar risk. Do not make the mistake of trying to hew an orchard out of an oak wood. I saw such a one the other day. The Apple trees had no fruit but looked nicely clad in green leaves. Every vestige of the first leaves had been eaten away by the hungry hordes of caterpillars which had drifted in from the wood. Those unhappy trees could never flower or fruit, for all flowers were eaten up and the second crop of leaf when the caterpillars had departed threw a terribly heavy drain on the food reserves of the trees.

Not till your Apples are picked can you estimate your success. This year for example has been a very favourable one for the codling moth. We had weeks of calm weather and the moth, reputed to be a feeble flyer, has had ample opportunity to get about and lay her eggs as she pleased. The result is a very wormy crop where no after-blossom spraying was done. I have more maggoty Apples than usual but they are all at the tops of tall old standards which need a power sprayer to reach them. Perhaps in all a fraction of one per cent. are codlin marked, but my neighbour, who sprays not at all, told me in September that every one of his was maggoty and he would not trouble to pick an Apple. In any case his crop was very small while mine was very heavy.

You cannot expect fruit to grow itself. Nature is reputed to maintain a balance between pests and their enemies, but to bank on her doing so reminds me of the story of the old man whose garden was the pride and the talk of the village. One day the parson walked up the path and said to the old man, " Well, George, you certainly have a wonderful garden here. Remarkable what can be done with God's help." The old man paused in his digging and said, " Maybe parson. Maybe. But should just a seen it when He had it to Himself."

At first spraying is bound to be a nuisance and a messy job, but if recommendations are followed the results will delight you. Study your insect pests. Get acquainted with their ways and life history so that you can deal with them at the right time and catch them on the hop. Better still learn to know your insect friends such as the larvae of the hover flies, the lacewing and the ladybird, for at times they may clear up an attack of greenfly without your bothering to spray against it.

PICKING

Picking presents a few pitfalls. The tendency generally among amateurs is to pick the early fruits too late and the late fruits too early. Soft fruits are easy. You wait till the crop is ripe and start picking and go on picking as the fruits ripen. The early dessert Apple varieties are good enough eaten off the tree but never worth keeping, yet there are very few private garden Apple stores you may enter in late September that have not a shelf or two of August Apples rotting or hopelessly over ripe.

A few early varieties can be quite good. 'Owen Thomas' eaten off the tree in August can be delicious, though I am told it is improved by a glass of port. A juicy 'Devonshire Quarrenden' or a really ripe 'Millers Seedling' leave few regrets. As for 'Lady Sudely' she can be eaten from the tree but not kept and the same applies to 'Exquisite' and 'Beauty of Bath.' 'Gladstone' ought never to have been put on the market at all. 'Ellison's Orange' too can be good enough in September, but if kept a few days too long tastes of aniseed and smells to high Heaven.

Early Pears with few exceptions cannot be eaten off the tree or allowed to ripen on it. Only last month I saw a very big 'Williams' Pear tree with the ground beneath covered with yellow fruit and many another on the tree. I asked the owner why he had not picked them and he said, "Oh, that's no good. You can't eat them, they're all woolly inside or rotten." If he had picked them green in good time and ripened them off he would have had twenty pounds worth of fine Pears to sell. The early Pears must be picked just as the green begins to show even a trace of a change to yellow. They must be dealt with quickly when they ripen and one of the best ways to deal with a surplus crop of 'Williams' Pears is to bottle them. 'Laxton's Superb' are said to be even better for this purpose. Late Pears are easier to deal with and can be left much longer on the tree, then stored and brought into the warmth of the house to ripen for a late Pear must be warmed up to ripen to perfection.

SURPLUS FRUIT

To have a crop and nothing to put it in is most annoying. Unless you are sure that an outhouse or cellar is mouseproof it is not safe to rely upon such a place for storage for the later fruits. There generally comes a time when the mice from the fields and even a rat or two make for house warmth and when they do the damage and mess that ensues in the Apple store is fearful.

Since soft fruit and Plums must be dealt with at short notice, buy your bottles out of season. Buy plenty, for lots of folk are thankful to have what you don't need. The official estimate of available soft fruit for the nation this summer was given as 7 lb. per family, which works out at about 2 oz. per week.

I find it better to bottle Pears than to store them since they last longer than way. If you are storing Apples do not tidy the attic, but clean up the cellar and see the mice cannot get in. Aim at a sustained low temperature rather than a variable one. A shed which gets no sun or a cold stone-floored dairy can be equally good. Get rid of every Apple which has its stalk pulled out, or a hole in the side or a bruise, a scab mark or a scratched skin. They will not keep.

Wrap your best Apples in oiled wraps or even newspaper. Trials over a given period of storage gave the following percentages of sound fruit: Oiled wraps 72 per cent. sound; newspaper wrapped 46 per cent. sound and not wrapped only 39 per cent. sound. Wraps prevent the spread of rot and any Apple or Pear that is put into storage with a skin flaw or puncture will not only rot itself if it is unwrapped, but will affect all Apples which adjoin it. Remember too that the biggest fruits are more liable to early collapse than the medium and small ones. Finally store in wood trays or boxes rather than cardboard which can taint the fruit if it has held cheese or butter, or if it gets damp.

This lecture has already been overlong, but there are so many pitfalls. OMAR KHAYYÁM might have written a couple of his famous lines specially for the amateur fruitgrower. They run:

> "Oh Thou, who didst with pitfall and with gin
> Beset the Road I was to wander in."

Well, as we all know, gin is to-day in extremely short supply, but the pitfalls remain as numerous as ever.

STORM OVER WISLEY

AT 5 P.M. on July 16, 1947, a few drops of rain began to fall at Wisley. One and a half hours later four inches, or just over, had descended on the Gardens, coupled with a high wind and hail-stones the size of the proverbial marbles. The effect of this visitation on the summer vegetation and steep, sandy slopes of Wisley can be imagined. The Director and Curator, viewing the devastation, felt that the commission of some particularly heinous sin must have caused the heavens to open over the Gardens—especially when it was learned later that Wisley was at the centre of a storm area only a few miles wide.

In its history of forty-three years Wisley has experienced many heavy summer storms, but, despite the fact that, after this one, no goldfish were found in the glasshouses (usually regarded at Wisley as the test of a really bad storm), it is doubtful if the holocaust of July 16 has ever been surpassed. During the twenty-four hours from 10 A.M. July 16 to 10 A.M. July 17, 4·53 inches of rain were recorded on Weather Hill and it is reckoned that nearly 4·25 of this must have fallen during the ninety-minute storm. The Meteorological Office has very kindly supplied the following particulars of what happened. "On the morning of the 16th a weak trough of low pressure extended south-eastwards over England and Wales and a feeble depression over N.E. France was moving slowly north-westwards. In the trough was a frontal surface separating warm moist air moving north-westwards from the Continent from cooler air moving eastwards from the Atlantic. The arrival of the cool air over Surrey during the afternoon undercut the warm damp air which was thermally unstable and had undergone surface heating. As a result convection from the surface up to a high level (i.e. at a height far below the freezing point of water) occurred. The rain drops carried upwards by the violent ascending currents froze and produced hail. Some of the stones, when leaving the cloud, must have been of such a size that they failed completely to melt before they reached the ground, where of course the temperature was well above freezing. The high wind associated with the storm was due to the local rapid cooling and increase of density of the column of air from cloud to earth by the partial evaporation of rain and melting of hail where these were abundant and fell through initially dry air." The storm appears to have been somewhere near an all-time record for the country. The most comparable earlier records, supplied by the Meteorological Office, are "3·63 in. in 60 mins. at Maidenhead, July 12th, 1901; 3·50 in. in 60 mins. at Beddington Corner, May 30th, 1903, and 4·65 in. in 150 mins. at Campden Hill (London), June 16th, 1917."

The pictures accompanying this note show something of the havoc that was wrought. Especially striking is the water-colour sketch of Seven Acres immediately after the storm by the Society's artist, Mr. Wise. Three inches of water covered the whole area, and despite the very porous soil did not drain completely away for a week. This particular result of the storm, however, can hardly be described as "havoc," since the thorough soaking given to lawns and shrub borders on level ground and to the Wild Garden proved a great blessing in the dry weeks that were to follow. On the slopes to the south of the Gardens, however, to the less robust herbaceous plants, and to fruit, much damage was done.

Rain fell so fast that the sandy surface soil was quickly removed from high ground and blocked the drains leading to the river. Two main torrents developed and rushed northwards. The first began on the Barley Field on Battleston Hill, swept through the Nursery, the Delphinium, Iris and other Trial grounds and the Curator's Garden, and poured into the car park and over the walls and steps near the Laboratory. Labels and plants were found lodged in the Hornbeam hedges 500 yards from their true homes and the correct replanting of the nurseries required a considerable effort of memory. The second and more severe stream began on Weather Hill, uprooting Rose bushes and other plants in its path, poured down the Lavender Walk and carried tons of soil into the Frame Yard. The glass houses and stoke hole quickly became flooded and Fellows sheltering in the Temperate House had to crowd for safety on to the centre bench. Later they had to remove their shoes and stockings and wade under escort to the Laboratory.

The greatest damage was done to the Annual Border, the Trials of Annuals (which had to be cancelled for the year) and the Early-flowering Chrysanthemums. Hail-stones reinforced the rain and floods; the leaves of many plants, such as Nasturtiums, were cut to ribbons and the surface of ripening Apples and Pears was badly pitted. Paths in the line of the main torrents were scoured into deep canyons, in some cases measuring 9 feet × 6 feet × 4 feet. Fortunately the Rock Garden escaped severe damage.

The task of repairing the devastation took two or three weeks of hard work, but nothing of course could bring the Annual Border and other sections of herbaceous plants up to the standard it had been hoped to reach before the storm.

It is doubtful whether any form of improved drainage could cope with a storm of this magnitude. Lesser downpours are, however, frequent at Wisley and steps are being taken to improve the surface and lay-out of key paths so that damage in the future will at any rate be mitigated.

NOTES FROM FELLOWS

The centenary of three introductions of distinction

AMONG the plants first introduced into England in 1847, three of the most distinguished came from America: *Ceanothus rigidus*, *Philesia buxifolia* and *Lapageria rosea*. The way in which these plants have withstood the severities of the last winter has proved that they are hardier than is commonly supposed.

Ceanothus rigidus was found in South California by K. T. HARTWEG, a collector sent out by the Horticultural Society. The late Mr. W. J. BEAN said that it was both one of the most beautiful of the Ceanothuses and also one of the tenderest. But by this time it has established a better reputation for hardiness. A note in this JOURNAL (May, p. 163) states that at Wisley "*Ceanothus rigidus* with bright blue flowers is almost our sole survivor among the evergreens of this family." In Vol. III of his *Trees and Shrubs*, Mr. BEAN distinguishes between the plant commonly in cultivation as *C. rigidus* and NUTTALL'S type plant as introduced by HARTWEG. The plant commonly cultivated has lighter flowers, leaves more distinctly toothed, and longer flower stalks than the other; and should apparently be called *C. rigidus* var. *pallens*. Mr. BEAN actually prefers it to the other, and says that it was introduced by WILLIAM LOBB for Messrs. VEITCH some time between 1849 and 1857. (Fig. 182.)

This indefatigable Cornishman was responsible also for the introduction of *Philesia buxifolia* (or *magellanica*, as perhaps it must now be called). This is "a rather difficult little Chilian," as the late Mr. EDEN PHILLPOTTS called it, "not often seen in prosperity." Its long rich rosy crimson flowers against its crisp dark green foliage are very handsome. Some weeks ago I saw the small plant in the Rectory garden at Ludgvan, and the larger one at Heligan near Mevagissey;

and both had successfully survived the rigours of last winter. They are both in semi-shade.

Lapageria rosea, like the last named, "one of the remarkable woody climbers belonging to the Lily family," is the national flower of Chile. Its long bells are of a rich rosy crimson and they have on their surface a fine shiny granulation so that they appear to be made of frozen snow. I owe the plant on the North wall of the Chapel of the Bishop's House (Lis Escop) to the late Canon ARTHUR BOSCAWEN. He chose the place and planted it with his own hands. It grew and flourished and flowered increasingly year by year. Last winter it suffered severely. But young shoots have appeared and the plant is rapidly recovering, though this year we must expect no flowers. (Fig. 183.)

Kew received *Lapageria rosea* from Chile in 1847; WILLIAM LOBB * sent it to Messrs. VEITCH the following year.

J. W. HUNKIN,
Bishop of Truro.

K. Wada San

The name of K. WADA is well known to many English gardeners as an exporter of choice Japanese plants. The Alpine Garden Society is especially indebted to him for the many lovely things he sent us for Alpine House and Rock Garden.

He visited this country about eight years ago and all who came in contact with him seem to have conceived a real liking for him. It came as a shock, therefore, when the rumour of his death at sea reached us. I have heard so many expressions of regret at his death that I think that extracts from a letter recently received from him may be of interest to his many gardening friends in this country. It is certain that great sympathy will be felt for him in the loss of his wife and baby son in such tragic circumstances.

When I was in Japan ten years ago I saw a good deal of WADA SAN and visited him and his family at Numazu where they showed me great kindness. His nursery, which is beautifully situated between the sea-coast and the foot of Mt. Fuji, was then full of interesting plants as was also his private garden. It was a little embarrassing on my return home three months later to find awaiting me many plants I had admired in nursery and garden accompanied with expressions of friendship. By some means he managed to get a letter through to us early in 1940 in which he expressed his sorrow for all that his English friends were called upon to endure at the hands of the Germans. He then mentioned his great unpopularity in his own country on account of his pro-British sympathies. It has always remained a mystery how this incriminating letter escaped the very strict Japanese censorship.

It is obvious that he is still in the nursery business but it is problematical whether we shall be permitted to import plants for many years to come.

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* I should like to take this opportunity of correcting a slip in my note on the brothers William and Thomas Lobb in the January number of this JOURNAL: p. 34, 17 lines from the bottom, for "fifty-three" read "fifty-five."

Mr. WADA writes that during the War he was not levied into the army but was watched by the police owing to suspicion of being opposed to Japanese militarism. He worked in Tokyo, and both his house in Tokyo and later his house at Numazu were destroyed by bombs and his wife and son subsequently died from their injuries. He also writes "So far as the raising of new meritable plants of great future value are concerned the past seven years were not wasted. I have raised a wonderful strain of Azaleas, a wonderful coloured Rhododendron, a new strain of Rhododendron eminently desirable for gardens for the leaves, habit and flowers, a new hybrid Magnolia, a hybrid Hamamelis, many fine Camellias, etc."

GWENDOLYN ANLEY.

Two Colours

In the spring of 1943 I was walking through the forests of *Abies cilicica* that clothe, to the exclusion of all other trees, a few sub-alpine slopes in the N. Lebanon. The forest of Silver Fir is a gloomy wolf-haunted place. For centuries the black humus has accumulated, and during the war man was only just beginning to fell the trees. In April the shadows of the forest are punctuated by the disturbing, incandescent brilliance of *Cyclamen vernum* var. *hiemale.* With it, though rarely, grows *Scilla Hohenackeri.* The intense Prussian blue of the Squill shining among the magenta-carmine flowers of the Cyclamen is a colour scheme which, though breathlessly daring, most definitely "comes off."

It also comes off in the garden. If the true *C. coum* is planted with *Scilla sibirica,* the problem of where to place these two individualists is solved. They neither "send each other up," nor "take each other off," but, on the bare earth of earliest spring, enhance the perfections of each.

Another successful alliance in the same dashing key—discovered in the garden quite accidentally—is that of *Geranium subcaulescens* with the tall form of *Anchusa caespitosa.* If the best colour-form of the Geranium is obtained (with black-centered, carmine flowers), the Cranesbill and the ultramarine Boraginad will do each other, and the gardener, good. The limestone scree is a suitable home for both.

P. H. DAVIS.

PLANTS TO WHICH AWARDS HAVE BEEN MADE IN 1947

Chrysanthemum 'Alpine.' A.M. September 16, 1947. As a disbudded early-flowering variety, for exhibition. Flowers double, reflexed, 5 inches diameter, pure white; stems stiff, clothed with rather large foliage. Raised and shown by Messrs. H. Shoesmith, Ltd., Mayford, Woking, Surrey. (See p. lxxxiv.)

Chrysanthemum 'Autumn Glow.' A.M. September 16, 1947. As an early-flowering single variety, for exhibition. Flowers single, with four or five rows of petals, 4 inches diameter, rich bronzy-coral with a golden disc. Raised and shown by Messrs. Johnsons (Florists), Ltd., Burton-on-Trent. (See p. lxxxiv.)

Chrysanthemum 'Gold of Ophir.' A.M. September 16, 1947. As an early-flowering disbudded variety, for exhibition. Flowers of compact form, double, 3½ inches diameter, rich golden-yellow, carried on stiff stems clothed with small foliage. Shown by Mr. Ron Thisthlethwaite, 83 Chesterfield Road, Barnet. (See p. lxxxiv.)

Chrysanthemum 'Mayford Orange.' A.M. September 16, 1947. As an early-flowering disbudded variety, for exhibition. Flower stems stout, clothed with medium sized foliage. Flowers double, 5½ inches diameter, rich golden-amber with a faint red flush. Raised and shown by Messrs. H. Shoesmith Ltd., Mayford, Woking, Surrey. (See p. lxxxiv.)

Chrysanthemum 'Peach Una.' A.M. September 16, 1947. As an early-flowering disbudded variety, for exhibition. A soft peach-pink 'sport' of 'Una.' Shown by Mr. H. Woolman, Sandy Hill Nurseries, Shirley, Birmingham. (See p. lxxxiv.)

Chrysanthemum 'Red Caesar.' A.M. September 16, 1947. As an early flowering disbudded variety, for exhibition. A rich crimson flowered 'sport' with a light bronze reverse of 'Caesar.' Shown by Mr. H. Woolman, Shirley, Birmingham. (See p. lxxxiv.)

Chrysanthemum 'Salmon Una.' A.M. September 16, 1947. As an early flowering disbudded variety for exhibition. Flowers incurved, salmon with old gold reverse, a 'sport' from 'Una.' Shown by Mr. G. R. Bacon, Heathfield Nurseries, Bingley, Yorks. (See p. lxxxiv.)

Chrysanthemum 'Tempest.' A.M. September 16, 1947. As an early-flowering disbudded variety, for exhibition. Flower stems stiff; foliage large; flowers double, 6 inches diameter, reflexing, rich crimson-bronze, with an old gold reverse. Raised and shown by Messrs. H. Shoesmith, Ltd., Mayford, Woking, Surrey. (See p. lxxxiv.)

Chrysanthemum 'Tibshelf Orange.' A.M. September 16, 1947. As an early-flowering disbudded variety, for exhibition. Flower stems long, stiff, with medium sized foliage. Flowers reflexed, double, 4¾ inches diameter, deep amber shaded orange. Raised and shown by Messrs. J. & T. Johnson, Tibshelf, Derby. (See p. lxxxiv.)

Chrysanthemum 'Typhoon.' A.M. September 16, 1947. As an early-flowering disbudded variety, for exhibition. Flower stems long, stiff; foliage small; flowers double, 4½ inches diameter, reflexed, deep crimson with a golden reverse. Raised and shown by Messrs. H. Shoesmith, Ltd., Mayford, Woking, Surrey. (See p. lxxxiv.)

Erinus alpinus var. **'Barbara Hammer.' A.M.** May 20, 1947. A pleasing deep carmine-pink variety of this well-known alpine, differing only from the original species in the colour of its flowers. Basal leaves spatulate, serrate in upper half, forming a small rosette, stem leaves alternate, flowers in terminal corymbs, corolla saucer-shaped with slender tube and five unequal lobes. Exhibited by C. H. Hammer, Esq., Guestwick Lodge, Chelmsford, Essex. (See p. lxvi.)

Thymus integer (syn. T. Billardieri). A.M. May 20, 1947. A distinct species introduced by Mr. P. H. Davies in 1941. It is found only in Cyprus, where it occurs on igneous rocks between 1,000 and 5,000 ft. on rocky slopes in full sun, forming neat cushions about 3 inches high and 9 inches in diameter. The leaves have numerous whitish hairs along the margins with scattered hairs on the upper surface ; in cultivation the growth is rather lax, lying along the ground and often rooting at the nodes. The flowers in few flowered heads are pale pink with an unusually long tube up to 1 inch in length in the best forms. The species is variable and should be propagated vegetatively to increase the stock of the most desirable forms. Exhibited by Mrs. C. B. Saunders, "Husseys," Green Street Green, Farnborough, Kent. (See p. lxvi.)

BOOK NOTES

"Plant Names Simplified, their Pronunciation, Derivation and Meaning." By A. T. Johnson and H. A Smith. 2nd Ed. viii. + 120 pp. 8vo. (Collingridge, London, 1947.) 7*s*. 6*d*.

The aim of this little book is admirable : it sets out "to offer the reader a simple translation and pronunciation of the names of such plants, trees and shrubs as are commonly grown in the average garden." The subject is, however, by no means a simple one. It demands the same critical erudition and the same high standards of scholarship as animated the compilers of the *Oxford English Dictionary*: behind its statements should lie the authority of historical research going back to original sources, not to third-hand compilations which repeat the errors of their predecessors and add some of their own The authors of this book have thus ventured where cautious scholars have feared to tread. As a result much of the book is unreliable, it contains many strange errors and fails to supply information which could have been obtained without much difficulty. Thus the derivation of the name *Bomarea* is here stated to be "unknown," although the original author of the name expressly dedicated it to a French naturalist, Valmont de Bomare. *Freesia*, likewise described as "derivation unknown," commemorates a German physician F. H T. Freese. The Russian medical inspector J. P. von Suworow is here described as "Suworow, a Japanese" ! Mme Lucile Boissier, after whom *Chionodoxa Luciliae* and *Omphalodes Luciliae* were named by her husband, Edmond Boissier, is here called "Mrs. Lucilia." *Paradisia*, commemorates an Italian, Giovanni Paradisi, and has no direct connection with "Gr. *Paradeisos*, a park or paradise." The specific epithet *Moly* in *Allium Moly*, though here said to commemorate "Moly, a botanist," possibly through confusion with J K. Maly, a nineteenth century Austrian doctor, is really a very old Greek name used by Homer. *Trollius* is not from the Latin *trulleum* but originated as a latinization of a Swiss German vernacular name "Trollblume." The epithet *dahurica* is stated under *Cimicifuga* to be "of Dahuri, China," although Dahuria or Dauria is part of Eastern Siberia. Chalcedon is in Asia Minor, not Greece.

The Latin word *ăbĭēs* has three syllables, not two as here ("*a-leez*"). *Campanula arvatica*, an alpine saxatile species, takes its name from Arvas (or Arbas) in the Cantabrian mountains ; here, however, it is explained as meaning "of fields, arable land." Inaccuracies of this kind occur throughout the book. The greater part of the derivations and translations given may be correct, but how is the reader to distinguish these from the many which are undoubtedly wrong ?

"The Propagation of Hardy Trees and Shrubs." By G. C. Taylor and F. P. Knight. 107 pp. 8vo. Illus. (B. H. Blackwell, Oxford.) 7*s*. 6*d*.

This is simply a reprint of this useful work as published in 1927 and reviewed in *Journ. R.H.S.* 53, 190 (1928), where it was observed that the book "might with advantage have been fuller, and perhaps more accurate in some particulars." It makes no reference to the knowledge which has been gained during the last twenty years, but remains a helpful and handy little guide to the propagation of the more easily increased trees and shrubs.

"A cultural table of Orchidaceous plants." By J. Murray Cox (Brisbane). 378 pp., including 13 coloured and 66 black and white illustrations. The Shepherd Press, Sydney, Australia, 1946. 4 guineas.

In his foreword the author states he is "dealing with those species of each genus that are cultivated by us (in Australia) or which I think are worth trying."

Australian and Eastern species are the more largely dealt with and the book should be of great value to orchid growers in Australia and also of service to orchid lovers in climates similar to that of Australia, especially where it is desired to acclimatize species foreign to the locality.

The Bush house largely used in Australia is valueless in England owing to our climate. Manures are used rather extensively in Australia and the East and under conditions in bush houses and the open air with advantages; here their use requires consideration with the greater number of orchids or disaster results.

The author hopes that the contents of his pages will prove interesting and useful. Interesting they are to all orchid growers, on whose bookshelves the book is well worth a place and, allowing for differences in climate and our "under glass" cultivation, thought will be evoked and valuable hints gained under the headings "Nutrition," pp. 7–10, "Light," pp. 11–22. "Things of Beauty," pp. 1–5, conveys a vivid, all too brief picture of some Australian orchids in the mass.

The main genera exotic to Australia and many of the native species fill pp. 31–314, the description of many with cultural hints. The analyses of composts, manures, the tables of rainfall and temperatures are also informative.

With the majority of the species the prevalent name has been retained, the correct title not always given in the Index, a few corrections might be added to the short list of errata, p. 314, but throughout the book evidence is given of the knowledge, the thought, interest and understanding given to orchids by the author.

The illustrations and the type used are clear and good.

E. Cooper.

"A Practical Course in Agricultural Chemistry." By F. Knowles and J. E. Watkins. (Macmillan & Co., Ltd., London. 1947.) 8vo. 215 pp. 20 Figs.

After an interval of ten years a second edition of this laboratory text has been prepared, the authors taking the afforded opportunity to revise and enlarge their subject matter. This has been accomplished by including short paragraphs on the newer compounds, such as the new synthetic insecticides and the selective weedkillers both of which receive brief notice.

To the gardening student the chapter on soils, in which will be found newer methods of estimating soil organic matter, and that on fertilisers, are to be strongly recommended as a means of gaining some laboratory experience to place alongside their day-to-day observations.

Such students should follow all the qualitative tests described here before attempting the National Diploma Examinations. Those who make up their own reagents will find help in this book. The simple tests to be made with insecticides and fungicides will assist the student to picture the action of some of these compounds, but a fuller chemical knowledge is needed for this section.

The other sections of the book are concerned with animal feeding stuffs, dairy products and matters lying outside the scope of a syllabus for horticultural students; nevertheless the book will prove useful in Institutions in which the classes are only concerned with horticulture. The standard is limited to the pass degree level.

M. A. H. Tincker.

"Herbal Delights." By Mrs. C. F. Leyel. Illustrated with drawings by M. E. Rivers Moore. (Faber & Faber.) 15*s*.

This is a revised and enlarged edition of Mrs. Leyel's book on herbs which first appeared in 1937. It is an attractive volume full of herbal lore of all kinds. This is one volume in a series designed by Culpeper House and it deals with herbs for pleasure with which are included aromatic tisanes, cordials, cooling herbs, herbs for refreshment, pot herbs and salads, spices and condiments, herbs which yield natural perfumes and cosmetic herbs. The term herb is used to include trees and shrubs. The historical information on the use of herbs is most interesting and in these times it is apt to know that "the root of couch grass is so nutritious that it has been made into bread when corn was scarce." A minor triumph of the book lies in the Indexes of which there are no fewer than six: botanical names, English names, country names, French names, Italian names and German names.

"The Forest, Forestry and Man." (Empire Forestry Association, distributed by Simpkin Marshall.) Illustrated. 4*s.*

This booklet was prepared for the Empire Forestry Conference and aims at providing a brief exposition of the historical background and scientific basis of forestry with a short review of the World and Empire timber position in the present, and prospects for the future. Like all such expositions, it is inevitably very generalized but, nevertheless, it should be read by all concerned with Forestry. It is illustrated with excellent photographs showing forests throughout the world and some forest products.

"Crop Production in Frames and Cloches." (Bulletin No. 65 of Min. of Agriculture. H.M.S.O.) Illustrated. 2*s.* 6*d.*

This pamphlet has been completely rewritten under the guidance of a Committee under the chairmanship of Mr. F. A. Secrett, and since the imposition of import duties on early produce this form of intensive market gardening has become very popular. It is not, however, an easy form of gardening and this booklet is recommended to all who wish to embark on a career in commercial market gardening and to all amateurs who wish to force early vegetables. Special attention is given to methods of heating frames, including heating by electricity, while a separate section is devoted to cloche cultivation.

"Planting for Plenty." By R. C. McMillan. (Faber & Faber, Ltd.) 8*s.* 6*d.* net.

This book is simply another of those publications, of which there is already a surfeit, written primarily for the guidance of allotment holders. The writer has arranged all fruit and vegetable gardening operations into forty-eight weekly periods, and all are arranged on one page only. This brevity omits many things that ought to be included, but as far as the instructions go they serve to remind the grower what he has to do and the time to do it. Each page is illustrated with an appropriate photograph; these are very good and without them the book would be somewhat bald and unconvincing as it is merely a very brief repetition of conventional work in the garden. One would have thought that the many books on this particular subject that are now in publication would have sufficed.

There is room for criticism in many of the instructions. For example, in the page headed "June—1st Week," the reader is told to select well-developed Tomato plants in pots for planting in an unheated greenhouse. Even in Scotland this is far too late; the work is generally done in the third week of April and is done very successfully. Then again, in the page headed "October—4th Week," a list of Apples, Pears and Plums is given. The lists are most unconvincing, and the author could easily have supplied the names of better and more reliable fruits. In the case of Apples, for instance, 'Laxton's Superb' does not do too well in Scotland and is very much inferior to 'Laxton's Fortune' which fruits abundantly and gives splendid quality. 'Bramley's Seedling' is recommended as a cooker; this is not a variety for the allotment nor for the average garden. The list of Pears and Plums is very restricted and many notable and reliable sorts are not mentioned.

The photographs are the best part of the book and they are admirably done and are well printed. The text is too restricted and the instructions they give have already been more fully elaborated in many other similar books.

G. M. TAYLOR.

"The Picture Primer of Indoor Gardening." By Margaret O. Goldsmith. Illus. by Harrie Wood. (Houghton Mifflin Co., Boston.) 2 dollars.

The art of growing house plants has been developed to a much greater extent in America than in this country and this is a highly coloured guide both to the methods and the varieties which are suitable there. This is an enthusiastic, and in its way, ambitious little book, full of useful tips for growing not only the more common bulbs but also a number of more unusual and exotic plants, although probably not every man will feel so anxious for the "exuberant mass display of ivy," advocated for the north window of his study.

"Harvesting and storing garden fruit." By Raymond Bush. 162 pp. Illustrated. (Faber & Faber, Ltd.) 12*s.* 6*d.*

Under this somewhat prosaic title Mr. Raymond Bush has written a book which makes engaging reading, not only to all interested in the culture of fruit but also to those many others concerned with its gastronomic uses. He has drawn widely upon his experience and his fund of reminiscences; these he introduces in a singularly attractive manner, so that the book becomes much more than a collection of statements of fact, such as of necessity most textbooks have to be.

By a liberal interpretation of the subject title Mr. Bush is enabled to deal with it in a very wide sense. First of all he discusses "fruit-growing districts," including temperature variation and elevation. He goes on to show "the influence of local climates" and indicates the kinds of fruits suitable for different districts and types of soils. An important chapter is devoted to "ensuring quality," in which recommended planting distances are given, manurial requirements discussed and other cultural details referred to. Further suggestions on culture generally are given in two chapters, one dealing with "apples: from blossom to harvest," and the other with "pears, plums, peaches, etc."

The "ripening and harvesting dates for tree fruits" are specially dealt with. Tables showing when fruits may be expected to mature and suggested dates for picking are given, but—as Mr. Bush mentions—all growers will not agree with the dates he gives. We think that the importance of the greatest possible care in gathering might well be stressed. "The soft fruit harvest" has a chapter to itself, embracing lists of the best sorts and their times of ripening, with hints on gathering, etc.

A valuable chapter is that dealing with the "natural storage of apples." Mr. Bush deals very thoroughly with the subject, making all sorts of useful suggestions for keeping fruits in a satisfactory condition for as long as possible.

"Fruit store design," illustrated with plans and cross-sections of different types of store, shows what can be done to ensure best results in the erection of a new store or the conversion of an existing building.

"Preservation of fruit by cold" is dealt with; and what will probably be of considerable interest to most readers is the chapter dealing with "preservation of fruit by heat" and all that this implies in the way of jam making, bottling, and so on. The subject is covered as comprehensively as possible in the relatively limited space available. It is really extraordinary the amount of information and the various "tips" Mr. Bush has managed to get in. Further chapters deal with cider, perry and home-made wines, etc. Recipes for making these are given in some detail.

There is no doubt that this book will be of interest and use to all fruit lovers, both amateur and professional. It is well illustrated.

Howard H. Crane.

"Lilies for the Beginner." By G. M. Taylor. (John Gifford, Ltd.) 79 pp. 6*s.* 6*d.*

"Lilies for the Beginner" is a useful book for any gardener beginning to grow Lilies. The author's enthusiasm is catching, and such enthusiasm is much to be commended. He emphasizes the importance of proper attention being paid to the condition of Lily bulbs because, as he rightly says, their good condition is vital to success. The chapters on suitable soils and positions for planting Lilies will be useful to all growers of Lilies. The author is well known for his skill in raising Lilies from seed and the chapter on this subject and the vegetative propagation of Lilies are particularly good. These chapters should be of much interest to all Lily growers, who will also be interested in his description of the process of vernalisation as a means of hastening the germination of Lily seed. The type of the book is large and easy to read. The practical experience of a good cultivator of Lilies is always of great value to other growers.

"Lilies for the Garden and Greenhouse." By D. T. Macfie. Second edition. 151 pp. 17 plates. 8vo. (W. H. & L. Collingridge, 1947.) 8*s.* 6*d.*

The first edition of this book appeared in 1939. Resetting of the type has permitted the author to make numerous alterations throughout the text and to add much new matter. It is one of the best of the smaller books on Lilies.

"Les Glaieuls." By F. Roehens, Vice-President of the Belgian Gladiolus Society. Second Ed. (La Société Belge du Glaieul, 61 Rue de la democratie, Brussels.) 30 fr.

This booklet contains a useful list with short descriptions of the main Gladiolus species, an interesting table of the parentage of some of the main forms of Gladiolus hybrids together with sections on cultivation, propagation and diseases.

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EXTRACTS FROM THE PROCEEDINGS
OF THE
ROYAL HORTICULTURAL SOCIETY

GENERAL MEETINGS

September 24, 1946.

SCIENTIFIC COMMITTEE.—Mr. E. A. BOWLES, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and five other members present.

Tibetan incense.—Mr. W. T. Stearn showed specimens of shoots and foliage of *Rhododendron setosum* and *R. lepidotum* which he had seen Tibetans gathering to dry and use as incense, and reported that shoots of *Juniperus rigida* and *J. Pseudosabina* were used by them for the same purpose The specimens were wrapped in exceedingly tough white paper made from the bark of *Daphne Bholua*

Buds on leaves of Tomato.—Prof. Weiss showed leaves of Tomato with small shoots growing from the swellings on the upper side of the leaf where the lateral veins leave the main vein. In some instances two shoots were present at this spot, and in one three.

Dahlia chimeras.—Mr. Palmer showed from Mrs. Horne's garden Dahlia 'Satan,' the lower half of which was yellow, the upper red, the division being clearly cut across the middle. This seemed to be a normal instance of a sectorial chimera, the one half being derived from a cell at the growing point with the full complement of character factors, the other from one which had lost one of the factors for colour. He also showed a flower of the deep crimson 'Lancastrian' and one derived from that variety with white tips to the rays. This was also probably of the same nature as the red and yellow chimera but was peculiar in that the history was unusual In 1944 a flower of this nature was seen and cuttings were taken from the stem bearing it. The plants from these cuttings all produced normal wholly carmine flowers in 1945, but in 1946 the white-tipped form had again appeared on some of the plants derived from the 1945 stock. A possible explanation seems to be that the cells producing these abnormal flowers were present in the 1945 plants but did not reach a place at the growing point which produced flowers, while this year they did If vegetative reproduction from shoots bearing such flowers is persisted in, probably in time most of the flowers borne will be white-tipped, as in the normal course the cells to which this character is due will gradually increase in number and become more widely diffused, though it may be long before the wholly carmine type is altogether eliminated.

FRUIT AND VEGETABLE COMMITTEE.—Mr. F. A SECRETT, V.M.H., in the Chair and eleven other members present.

Awards Recommended :—

Silver-gilt Knightian Medal.

To His Grace, The Duke of Rutland, Belvoir Castle, nr. Grantham (Gardener Mr. Stanton), for group of Vegetables.

Silver Hogg Medal.

To Mr. J. Read, Hockley, Essex, for group of Melons.

Silver Lindley Medal

To Messrs. Watkins & Simpson, 27 Drury Lane, London, W.C. 2, for a collection of Tomatoes.

Selected for trial at Wisley.

Apple 'Bakers Delicious' from Messrs Bakers, Codsall, Wolverhampton.

Other Exhibits.

Apple 'Highgate Pippin' from H. H. Crane, Esq , Highmead, Cheney Lane, Eastcote, Pinner.

Apple 'Stokes Muston Marvel' from B. G. Stokes, Esq., Muston Farm, Hazelbury Bryan, Sturminster Newton, Dorset.

Peach 'Diana Grace' from Miss D. G. Miles, 26 Greenway Lane, Chippenham, Wilts.

Pear 'Honey Pear' from L. J. Cook, Esq., Dingeden, Drapers Road, Enfield, Middlesex.

Seedling Apple from H. E. Bennett, Esq., Ditton Court, Maidstone.

Seedling Peach from H. M. Gadge, Esq., 9 Longley Road, Tooting, London, S.W. 17.

Seedling Peach from A. A. Exell, Esq., 22 Beastney Estate, Hill End, St. Albans.

Group of Alpine Strawberries and outdoor Grapes from Mr. Clarence Elliott, Six Hills Nursery, Stevenage, Herts.

FLORAL COMMITTEE A.—Mr. G. W. Leak, V.M.H., in the Chair, and nine other members present.

Awards Recommended :—

Gold Medal.

To Messrs. Bees, Ltd., Chester, for an exhibit of herbaceous plants.

To Mr. Stuart Ogg, Swanley, for an exhibit of Dahlias.

Silver-gilt Flora Medal.

To Messrs. Thomas Carlile, Ltd., Twyford, for an exhibit of Michaelmas Daisies and other herbaceous plants.

Silver-gilt Banksian Medal

To Messrs. Allwood, Bros., Haywards Heath, for an exhibit of Carnations and Dianthus Allwoodii.

To Messrs. Brown & Such, Ltd., Maidenhead, for an exhibit of Dahlias.

To Messrs. J. F. Spencer & Son., Ltd., Hockley, for an exhibit of Dahlias.

To Mr. H. Woolman, Birmingham, for an exhibit of Chrysanthemums.

Silver Flora Medal.

To Messrs. Blackmore & Langdon, Bath, for an exhibit of Delphiniums, Cyclamen and herbaceous plants

To Messrs. Kelway & Sons, Ltd., Langport, for an exhibit of Gladioli.

Silver Bankian Medal.

To Messrs. Bakers Nurseries, Ltd., Codsall, for an exhibit of Chrysanthemums.

To Messrs. Napier, Taunton, for an exhibit of Chrysanthemums.

To Messrs. Wilson & Clark, Cricklewood, for an exhibit of Chrysanthemums.

Flora Medal.

To Mr. Amos Perry, Enfield, for an exhibit of herbaceous and water plants.

To Mr. E. V. Roe, Reigate, for an exhibit of Chrysanthemums.

To Mr. Stephen Sims, Draycott, for an exhibit of Chrysanthemums and herbaceous plants.

To the Spinney Nurseries, Knockholt, for an exhibit of Chrysanthemums.

To Messrs. Wheatcroft Bros , Ltd., Nottingham, for an exhibit of Roses.

To Mr. G. G. Whitelegg, Chistlehurst, for an exhibit of Chrysanthemums and herbaceous plants.

To Messrs. Wm. Wood & Son, Ltd., Taplow, for an exhibit of Michaelmas Daisies.

Banksian Medal.

To Messrs. C. Engelmann, Ltd., Saffron Walden, for an exhibit of Chrysanthemums

To Home Meadows Nursery, Martlesham, for an exhibit of Dahlias and herbaceous plants.

To Mr. M. P. Kooper, Frendown, for an exhibit of herbaceous plants.

To Messrs. M. Pritchard & Sons, Ltd., Christchurch, for an exhibit of herbaceous plants.

Selected for trial at Wisley.

Aster ' Little Red Boy,' from Messrs. Wm. Wood & Son, Ltd., Taplow.

Kniphofia ' Bees Lemon,' from Messrs. Bees, Ltd., Chester.

Other Exhibits.

Aster amellus seedling I/40, from Mr. N. Leslie Cave, Thames Ditton.

Aster ' Mighty Atom ' from Mr. C. E. Bridgett, Hampton Wick.

Aster Murrayii ' Wirral Queen,' from Burleydam Nurseries, Ltd., Wirral.

Aster ' Sunset,' from Mr. C. E. Bridgett, Hampton Wick.

Chrysanthemums, from Mr. A. Murray, Lake, Sandown, I.W.

FLORAL COMMITTEE B.—Mr. E. A. Bowles, M.A., F.L.S., V.M.H., in the Chair, and fifteen other members present.

Awards Recomended :

Silver-gilt Banksian Medal.

To Messrs. Hillier & Sons, Winchester, for an exhibit of foliage and berried shrubs.

Silver Flora Medal.

To Messrs. J. Cheal & Son, Crawley, for an exhibit of foliage and berried shrubs.

Silver Banksian Medal.

To the Elstead Nurseries, Godalming, for an exhibit of berried shrubs and rock garden plants.

Flora Medal.

To Messrs. R. C. Notcutt, Ltd., Woodbridge, for an exhibit of foliage and berried shrubs.

Banksian Medal.

To Messrs. Burkwood & Skipwith, Ltd., Kingston, for an exhibit of flowering shrubs.

To Mr. J. Klinkert, Richmond, for an exhibit of clipped Box trees.

To Messrs. L. R. Russell, Ltd., Windlesham, for an exhibit of shrubs.

Award of Merit.

To *Sorbus pohuashanensis* as a hardy, ornamental-fruiting tree (votes 9 for, 0 against), from the Director, R.H.S. Gardens, Wisley.

Other Exhibits.

Rock garden plants, exhibited by the Orchard Neville Nurseries, Baltonsborough.

Malus Ringo, exhibited by Messrs. Wm. Wood & Son, Taplow, Bucks.

ORCHID COMMITTEE.—Mr. Gurney Wilson, F.L.S., V.M.H., in the Chair, and ten other members present.

Awards Recommended :—

Silver-gilt Banksian Medal.

To Messrs. Sanders, St. Albans, for a group of Orchids.

Silver Flora Medal.

To Messrs. Charlesworth & Co., Haywards Heath, for a group of Orchids.

Award of Merit.

To *Cypripedium* × ' St. Swithin ' (*philippinense* × *Rothschildianum*) (votes 9 for, 0 against), from Messrs. Sanders, St. Albans. (See p. 42.)

To *Laeliocattleya* × ' Fiesta ' (*Lc.* ' Canberra ' × *C. Dowiana*) (votes 9 for, 0 against), from Mr. Clint McDade, Chattanooga, Tennessee, U.S.A.

To *Cattleya* × ' Bow Bells ' var. ' Snow Queen ' (' Susanne Hye ' × *Edithiae*), (votes 10 for, 0 against), from Mr. Clint McDade, Chattanooga, Tennessee, U.S.A. (See p. 41.)

Cultural Commendation.

To Messrs. Sanders, St. Albans, for a vigorous example of *Cypripedium* × A. de Lairesse ' var. ' Excelsior ' (*Curtisii* × *Rothschildianum*).

JOINT DAHLIA COMMITTEE.—Mr. T. Hay, C.V.O., V.M.H., in the Chair, and seven other members present.

Selected for Trial at Wisley.

' George Lawrence,' ' Lilian Howich,' ' Mauveron,' ' Smokey,' ' Velva,' from Messrs. Brown & Such, Maidenhead.

' Heide Jescot,' from Messrs. E. Cooper & Son, St. Albans.

' Bourne Crimson,' from Mr. Owen Parratt, Farnham.

JOINT EARLY-FLOWERING CHRYSANTHEMUM COMMITTEE.—Mr. G. W. Leak, V.M.H., in the Chair and nine other members present.

Exhibits.

' Oceanic,' (selected for trial at Wisley 1944) shown by Messrs. H. Woolman, Sandy Hill Nurseries, Shirley, Nr. Birmingham.

' Hartswood Gem,' shown by Mr. E. V. Roe, Hartswood Nursery, Reigate, Surrey.

' Ellen of Lake ' and ' Gwen Bernard,' shown by Mr. Andrew Murray, Cliff Path, Lake, Sandown, Isle of Wight.

JOINT ROCK-GARDEN PLANT COMMITTEE.—Col. F. C. Stern, F.L.S., V.M.H., in the Chair, and eight other members present.

Exhibits.

From the Director, R.H.S. Garden, Wisley; *Limonium cancellatum*.

From Messrs. M. Pritchard & Sons, Ltd., Christchurch, Hants.; *Campanula cashmiriana*.

OCTOBER 8, 1946

SCIENTIFIC COMMITTEE.—Mr. E. A. Bowles, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and seven other members present.

Plants Identified.—Dr. Turrill reported that the crab referred to this Committee from the Floral Committee was *Malus Ringo*, which is sometimes called *M. prunifolia* var. *Rinki*, introduced from Japan. Mr. Jackson reported that Mr. Hubbard, of Kew, had identified the Chusquea, shown at the meeting of September 10 as *C. Culeou*, a native of Chile, figured in Gay's Atlas t. 83.

Fruit of Betula lutea.—Mr. Jackson showed the large prickly fruiting catkins of *Betula lutea* from a tree at Dawyck, Peebleshire.

Bi-coloured Calluna.—Mr. Gilmour showed a stem of *Calluna vulgaris* from Skye, one branch of which bore flowers of the usual purple colour, the other pure white flowers. The sport has been recorded before, see, *e.g.*, *Kew Bulletin*, 1920, p. 221, and has also been found in Sweden.

Discoloured Corms and Bulbs—Mr. Trotter sent corms of *Crocus laevigatus* and bulbs of a Tulip which normally have dark brown tunics, with pale drab tunics. These were referred to Mr. Green for examination.

Crested Hartstongue.—Mr. Belderson sent fronds of Hartstongue from his garden at Enfield, originally collected at Abergele, having the tips twice or thrice forked. This form is well-known to fern-growers and can be propagated from leaf-bases and probably from spores.

FLORAL COMMITTEE A.—Mr. G W. Leak, V.M.H., in the Chair, and fifteen other members present.

Awards Recommended :—

Gold Medal.

To Mr. Stuart Ogg, Swanley, for an exhibit of Dahlias.

Silver-gilt Flora Medal.

To Messrs. Brown & Such, Ltd., Maidenhead, for an exhibit of Dahlias.

To Messrs. Thomas Carlile, Ltd, Twyford, for an exhibit of Michaelmas Daisies.

To Mr. Stuart Ogg, Swanley, for an exhibit of Michaelmas Daisies and Chrysanthemums.

Silver-gilt Banksian Medal.

To Messrs. Bakers Nurseries, Ltd., Codsall, for an exhibit of Michaelmas Daisies, Chrysanthemums, Lupins, etc.

To Messrs. Napier, Taunton, for an exhibit of Chrysanthemums.

To Messrs. J. F Spencer & Son, Ltd, Hockley, for an exhibit of Dahlias.

To Messrs. A. G. Vinten, Ltd., Balcombe, for an exhibit of Chrysanthemums.

To Messrs. John Waterer, Sons & Crisp, Ltd., Twyford, for an exhibit of Michaelmas Daisies, Dahlias, etc.

To Messrs. E. Webb & Son (Stourbridge), Ltd., Stourbridge, for an exhibit of Michaelmas Daisies, Chrysanthemums, Dahlias.

To Messrs. Wm. Wood & Son, Ltd., Taplow, for an exhibit of Michaelmas Daisies.

Silver Flora Medal.

To Messrs. Blackmore & Langdon, Bath, for an exhibit of Begonias and Cyclamen.

To Messrs. Keith Luxford, Sawbridgeworth, for an exhibit of Chrysanthemums.

Silver Banksian Medal.

To Messrs. Allwood Bros., Haywards Heath, for an exhibit of Carnations.

To Messrs. G. & R. Perry, Enfield, for an exhibit of herbaceous and water plants.

To Mr. E. V. Roe, Reigate, for an exhibit of Chrysanthemums.

Flora Medal.

To Messrs. Allwood Bros., Haywards Heath, for an exhibit of Dianthus Allwoodii.

To Messrs. Biddlecombe Bros., Bracknell, for an exhibit of Chrysanthemums and Carnations.

To Messrs. J. Cheal & Sons, Ltd., Crawley, for an exhibit of Dahlias.

To Mr. Stephen Sims, Draycott, for an exhibit of Chrysanthemums and herbaceous plants.

To Messrs. Wheatcroft Bros., Ltd., Nottingham, for an exhibit of Roses.

To Mr. G. G. Whitelegg, Chislehurst, for an exhibit of Michaelmas Daisies.

Banksian Medal.

To Messrs. C. Engelmann, Ltd., Saffron Walden, for an exhibit of Carnations.

To Messrs M. Prichard, Ltd, Christchurch, for an exhibit of Michaelmas Daisies and rock plants.

To Messrs. Robinson, Eltham, for an exhibit of herbaceous plants and alpines.

To Widbrook Nurseries, Cookham, for an exhibit of Michaelmas Daisies and other herbaceous plants.

Award of Merit.

To Rose 'Arthur J. Taylor' (votes 8 for, o against), from Messrs. Wheatcroft Bros, Ltd, Nottingham.

Preliminary Commendation

To Nerine 'Henry Elwes,' from Lt-Col H. C. Elwes, M.V O, D.S O., Colesbourne, Cheltenham.

Selected for trial at Wisley.

Aster 'Bishop,' 'Blandie,' 'Peace,' 'Plenty,' 'Prosperity,' 'Rosebud,' from Mr. E. Ballard, Old Court Nurseries Ltd., Colwall.

'Seedling' (deep rose), from Mrs. Dawkins, The Hoppet, Little Baddow, Essex.

'The Archbishop,' 'The Cardinal,' 'The Dean,' 'The Verger,' from Mr. E. Ballard, Old Court Nurseries, Ltd, Colwall.

Chrysanthemum 'Glorious,' 'Matchless,' from Mr. H. Shoesmith, Mayford, Woking.

Other Exhibits.

Achimene, from Mr. C. J Howlett, Earley, Reading.

Aster 'Albanian,' from Messrs. E C. Simmonds & Son, St Albans.

Chrysanthemum 'Incurved Alfreton Beauty,' from Mr. W. B. Jackson, Waverton, Chester.

FLORAL COMMITTEE B.—Mr. E. A. BOWLES, M A., F.L.S, F R.E.S., V.M.H, in the Chair, and nineteen other members present.

Awards Recommended:—

Silver-gilt Banksian Medal.

To Messrs. Hillier & Son, Winchester, for an exhibit of foliage and berried trees and shrubs.

To Messrs. J. Waterer, Sons & Crisp, Ltd., Bagshot, for an exhibit of foliage and berried shrubs.

Silver Flora Medal.

To Donard Nursery Co., Ltd, Newcastle, Co Down, for an exhibit of flowering shrubs and herbaceous plants.

To Messrs. D. Stewart & Sons, Ltd, Ferndown, for an exhibit of foliage and berried shrubs.

To Messrs. Whitelegg, Chislehurst, for an exhibit of coniferous shrubs.

Silver Banksian Medal.

To Messrs. J. Cheal & Sons, Ltd., Crawley, for an exhibit of foliage and berried shrubs.

To Elstead Nurseries, Godalming, for an exhibit of berried shrubs and hardy flowers.

Flora Medal.

To Messrs. Burkwood & Skipwith, Ltd., Kingston, for an exhibit of flowering and berried shrubs.

Banksian Medal.

To Mr. J. Klinkert, Richmond, for an exhibit of clipped Box trees.

To Orchard Neville Nurseries, Baltonsborough, for an exhibit of a rock garden.

Award of Merit.

To Clematis 'Snow Cap' as a hardy, flowering, climbing shrub (votes 9 for, 4 against), from Viscount Hambleden, Henley-on-Thames. (See p. 42.)

To *Helianthus orgyalis* as a hardy, flowering border plant (votes 12 for, 3 against), from the Director, Royal Botanic Gardens, Kew.

Preliminary Commendation.

To *Schima khasiana* as a half-hardy, flowering shrub (votes 14 for, o against), from Lt.-Col. E. H. W. Bolitho, Penzance.

Other Exhibits.

Berberis rubrostilla crawleyensis, exhibited by Messrs. J. Cheal & Sons, Ltd., Crawley.

Calluna vulgaris 'H. E. Beale,' exhibited by R. Waterson, Esq., Glasgow.

Fuchsia 'Thalia,' exhibited by C. J. Howlett, Esq., Reading.

Grevillea Banksii, pale form, exhibited by G. H. Johnstone, Esq., Grampound Road, Cornwall.

Hypericum 'Rowallane Hybrid,' *Kniphofia Galpinii*, exhibited by the Donard Nursery Co., Newcastle, Co. Down.

ORCHID COMMITTEE.—Mr. Gurney Wilson, F.L.S., V.M.H., in the Chair, and eight other members present.

Awards Recommended:—

Award of Merit.

To *Brassolaeliocattleya* × 'Dawn Angela' var. 'Tennessee' (*Lc.* 'Ishtar' × 'Heather Queen'), (votes 8 for, 0 against) from Mr. Clint McDade, Chattanooga, Tennessee, U.S.A. (See p. 40.)

To *Laeliocattleya* × 'Derrynane' var. 'Comet' (*Lc.* 'Balkis' × *Lc.* 'Princess Margaret'), (votes 7 for, 0 against), from Major the Hon. H. R. Broughton, Bakeham House, Englefield Green, Surrey.

JOINT DAHLIA COMMITTEE.—Mr. T. Hay, C.V.O., V.M.H., in the Chair, and nine other members present.

Awards Recommended:

Award of Merit.

To Dahlia 'Dora Ramsey' as a variety for exhibition (votes 9 for, 0 against), from Messrs. J. Stredwick & Son, St. Leonards-on-Sea. (See p. 43.)

Selected for trial at Wisley.

'Clyde Reeves,' 'Kingsbrook Scarlet,' from Mr. A. T. Barnes, Bedford.

'Bengee,' 'Dora Ramsey,' 'Festive,' 'Peri,' 'St. Helen,' and 'Tango,' from Messrs. J Stredwick & Son, St. Leonards-on-Sea.

Dahlias were also submitted by Messrs. E Cooper & Son, St. Albans.

OCTOBER 22, 1946

SCIENTIFIC COMMITTEE.—Mr. E. A. Bowles, M.A., F.L.S, F.R.E.S, V.M.H., in the Chair, and five other members present.

Discoloured Bulbs—Mr. Green reported that the bulbs shown at the last meeting were discoloured owing to the presence of the mycelium of a fungus, possibly a species of Corticium such as one may often find in undisturbed soil. It had not invaded the tissues of the bulbs and was harmless.

D.D.T. and Wireworms.—Mr. G. F. Wilson showed the results of dressing the soil with D.D.T. and Gammexane as a means of checking wireworms. The soil treated at Wisley was much infested with wireworms and the crop on the control (untreated) plot suffered greatly. The two plots with the same crops where the soil had been treated with D.D.T. showed no improvement, indeed one suffered more damage than the control. The crops on the two plots treated with Gammexane were much better, though no dead wireworms had been found as a result of the treatment, but the strong persistent odour of the insecticide militated against its use for food crops, though where other plants are concerned it appears to give an effective measure of protection.

Fasciation in Cryptomeria japonica. Commander Gilliland of Brook Hall, Londonderry, sent a shoot of *Cryptomeria japonica* much fasciated and 1½ inch across in the widest part, under the name of var. *cristata*. This may be the same as var. *fasciata* referred to by Dr. Masters in R.H.S. Journal, vol. xiv, p. 203. Fasciation appears to be a rare phenomenon in Conifers, though common in most perennial plants.

Viviparous inflorescence of Primula Florindae.—Mr. L. Maurice Mason, of Talbot Manor, Fincham, Norfolk, sent an inflorescence of *Primula Florindae* with numerous young shoots among the flowers in the inflorescence, a condition which appears uncommon in Primulas.

FRUIT AND VEGETABLE COMMITTEE.—Mr. F. A. Secrett in the Chair, and ten other members present.

Exhibits.

Collection of Onions and Spinach from the Director, R.H.S. Gardens, Wisley.

Apple 'Corry's Wonder,' from J. F. Wastie, Esq., Eynsham, Oxford.

Apple 'Illingworth Surprise,' from Miss M. Illingworth, The Way's End, Foxton, Royston, Herts.

Apple 'Wardington Seedling,' from Lady Wardington, Wardington Manor, Banbury, Oxon.

Seedling Apple from C. W. Rudd, Esq., King's Dyke, Whittlesey, Peterborough.

Marrow 'Foxcombe Snowball,' from Mrs A. H Radice, Foxcombe Orchard, Boar's Hill, Oxford.

FLORAL COMMITTEE A.—Mr. G W. LEAK, V.M.H., in the Chair, and twelve other members present.

Awards Recomended :—

Gold Medal.

To Mr. Stuart Ogg, Swanley, for an exhibit of Dahlias.

Silver-gilt Banksian Medal.

To Messrs. Allwood Bros., Haywards Heath, for an exhibit of Carnations and Dianthus Allwoodii.

To Messrs J. F Spencer & Son, Ltd., Hockley, for an exhibit of Dahlias.

To Messrs. A. G Vinten, Ltd., Balcombe, for an exhibit of Chrysanthemums.

Silver Flora Medal.

To Mr. A. T. Barnes, Bedford, for an exhibit of Dahlias.

To Messrs. Blackmore & Langdon, Bath, for an exhibit of Chrysanthemums, Cyclamens, etc.

To Messrs. Brown & Such, Ltd, Maidenhead, for an exhibit of Dahlias

To Messrs Napier, Taunton, for an exhibit of Chrysanthemums.

To Messrs. Wm Wood & Son, Ltd, Taplow, for an exhibit of Michaelmas Daisies, Chrysanthemums, Dahlias.

Silver Banksian Medal

To Messrs Bakers Nurseries, Ltd, Codsall, for an exhibit of Chrysanthemums, Michaelmas Daisies, Lupins, etc.

Flora Medal.

To Messrs Thomas Carlile, Ltd, Twyford, for an exhibit of Michaelmas Daisies and other herbaceous plants

To Messrs. C Engelmann, Ltd, Saffron Walden, for an exhibit of Carnations

To Messrs. Napier, Taunton, for an exhibit of Carnations.

To Messrs. G. & R. Perry, Enfield, for an exhibit of Chrysanthemums, herbaceous and water plants.

To Mr. E. V. Roe, Reigate, for an exhibit of Chrysanthemums.

To the Orpington Nurseries Co, Ltd., Orpington, for an exhibit of Korean Chrysanthemums.

To Messrs Wheatcroft Bros, Ltd, Nottingham, for an exhibit of Roses.

Award of Merit.

To Rose 'R. S Hudson' (votes 12 for, 0 against), from Messrs Wheatcroft Bros., Ltd, Ruddington, Nottingham

Selected for trial at Wisley.

Korean Chrysanthemum 'Fuchsia Rose,' 'Tangerine,' 'Tapestry Rose,' from the Orpington Nurseries Co, Ltd., Orpington.

Other Exhibits.

Rose 'Lady Trent' (to be seen again), and Rose 'Wheatcroft's Golden Polyantha,' from Messrs. Wheatcroft Bros, Ltd, Nottingham.

FLORAL COMMITTEE B.—LORD ABERCONWAY, C B.E, V M H., in the Chair, and twenty-two other members present.

Awards Recommended:

Silver-gilt Flora Medal.

To Messrs. R. Gill & Son, Penryn, Cornwall, for an exhibit of evergreen, ornamental-leaved Rhododendrons.

Silver Flora Medal.

To Messrs. Hillier & Son, Winchester, for an exhibit of ornamental-leaved trees and shrubs.

Silver Banksian Medal.

To Messrs. Burkwood & Skipwith, Ltd., Kingston, for an exhibit of flowering and berried shrubs.

To Elstead Nurseries, Goldalming, for an exhibit of berried shrubs and rock-garden plants.

To Knap Hill Nursery Co., Woking, for an exhibit of ornamental-leaved trees and shrubs.

To Mr. G. G. Whitelegg, Chislehurst, for an exhibit of coniferous and other shrubs.

Flora Medal

To Mr. F. Street, Woking, for an exhibit of berried shrubs.

To Messrs. L. R. Russell, Ltd., Windlesham, for an exhibit of berried and ornamental-leaved shrubs.

Banksian Medal.

To Mr. J. Klinkert, Richmond, for an exhibit of clipped Box trees.

To Mr. Stephen Sims, Draycott, Derbyshire, for an exhibit of coniferous and other shrubs.

Award of Merit.

To *Prunus Persica* 'Palace Peach' as a hardy, flowering tree (votes unanimous), from Messrs. L. R. Russell, Ltd , Windlesham, Surrey. This award was recommended, subject to the provision of a varietal name, on March 26, 1946.

To Rose 'Canarybird' as a hardy, flowering shrub (votes unanimous), from Messrs. L. R. Russell, Ltd , Windlesham, Surrey. This Rose was shown as *R. xanthina* 'Canary' on May 1, 1945, when the award was recommended subject to revision of name.

Other Exhibits.

Acanthopanax ricinifolium, A. setchuenense, exhibited by Sir Henry Price, Ardingly.

Adiantum venustum, exhibited by Mr. Amos Perry, Enfield.

Buddleia × *Weyeriana, Eucryphia* × 'Rostrevor,' exhibited by Cdr. F. Gilliland, Londonderry.

Cotoneaster Dielsiana, Myrtus communis var. *tarentina, Pyracantha crenulata* var. *flava, P.c.* var. *Rogersiana,* exhibited by Col. F. C. Stern, F.L.S., V.M.H., Goring-by-Sea

Crocus karduchorum, exhibited by A Simmonds, Esq., N.D.H , Clandon.

Garrya elliptica, female form, exhibited by Lord Aberconway, C.B.E., V.M.H., Bodnant.

Prunus pumila, exhibited by Dr. Lane-Roberts, Welwyn.

Pyracantha crenulata var. *Rogersiana* seedlings, exhibited by Knap Hill Nursery Co., Woking.

ORCHID COMMITTEE.—Mr GURNEY WILSON, F.L.S., V.M.H., in the Chair, and three other members present.

Awards Recommended :—

Silver-gilt Lindley Medal.

To Lord Aberconway, C.B.E., Bodnant, Tal-y-Cafn, for a group comprising about seventy well-cultivated plants of white-flowering Cypripediums.

Silver-gilt Banksian Medal.

To Messrs. Sanders, St. Albans, for a group of Orchids.

Silver Flora Medal.

To Messrs. Stuart Low & Co., Jarvis Brook, for a group of Orchids.

Award of Merit.

To *Oncidium Lanceanum,* St. Albans var. (votes 3 for, 1 against), from Messrs. Sanders, St. Albans.

JOINT ROCK-GARDEN PLANT COMMITTEE.—COL. F. C. STERN, F.L.S., V.M.H., in the Chair, and eleven others members present.

Awards Recommended :—

Cultural Commendation.

To Mr. J. T. Wall, Superintendent of the Rock Garden, R.H.S. Gardens, Wisley, for a well-grown plant of *Phyllodoce caerulea* in full flower.

EXTRACTS FROM THE PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

REPORT OF THE COUNCIL

TO THE ONE HUNDRED AND FORTY-THIRD ANNUAL MEETING OF THE SOCIETY, TO BE HELD IN THE LECTURE ROOM OF ITS NEW HALL, GREYCOAT STREET, WESTMINSTER, AT 3 P.M. ON TUESDAY, FEBRUARY 18, 1947.

The year 1946 has been one in which the activities of the Society have been rapidly returning to normal. A full programme of Shows has been carried out in the Society's halls, at which the standard of exhibits was of a high quality. The attendance at these Shows was very gratifying and considerably more members of the general public have visited them than for many years.

This year is the first in which the new scales of subscription have been introduced and, although there was inevitably an initial drop in the number of Fellows, the response on the whole has been very gratifying, and the great majority of the Fellows have shown their appreciation of the Society's work by paying the increased rates. The Council is very grateful to all these Fellows, whose loyalty has enabled the Society to continue to expand its work for the advancement of horticulture, instead of, as was feared, having to curtail some of its important activities.

The Fellowship of the Society is as follows :—

(*Figures up to and including November* 5, 1946)

LOSS BY DEATH IN 1946	
Honorary Fellows	4
Associates of Honour	9
Life Fellows	23
4 Guinea Fellows	3
3 ,, ,,	173
2 ,, ,,	217
Associates	4
	433

LOSS BY RESIGNATION	
4 Guinea Fellows	11
3 ,, ,,	914
2 ,, ,,	3995
Associates	103
Affiliated Societies	84
	5,107
Less reinstated	226
	4,881

ELECTIONS IN 1946	
Life Fellows	63
4 Guinea Fellows	159
3 ,, ,,	1,546
2 ,, ,,	2,956
Associates	165
Affiliated Societies	154
	5,043

SUMMARY FOR 1946	
Elections	5,043
Resignation and Deaths	5,314
Net DECREASE	271

Position on November 5, 1946	
Fellows	25,832
Associates	711
Affiliated Societies	815
Total	27,358
Total on September 11, 1945	27,629 *

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* An adjustment to the total fellowship of the Society as shown in the last report has been made by a recount of the card index.

Programme for 1946.—The full programme arranged for the year was carried out without any hindrance. A special three-day Show, held on May 28, 29 and 30, was particularly successful, both in the number and variety of exhibits and also in the attendance of Fellows and of the public.

The Shows in general during the past year have improved considerably. The gradual return of staffs have enabled a larger number of nurserymen and amateurs to resume exhibiting or to exhibit more frequently and to put up larger groups, so that on several occasions the displays of plants, flowers, fruits and vegetables have occupied the whole of the Hall and no space has been available for horticultural sundries. Many exhibitors have also given increased attention to the staging of their exhibits and have shown a greater readiness to occupy island sites which allow of more attractive arrangement than sites against the walls and lend themselves more readily to the production of pleasing layouts for the Shows.

Most of the Competitions held during the year have been successful, in particular those for Rhododendrons and Shrubs.

The Council is again grateful for the welcome co-operation of various scientific and public institutions who have from time to time staged exhibits of considerable educational and horticultural value.

Programme for 1947.—There has been a considerable demand, both from Fellows and the general public, for the resumption of the Chelsea Show. The Council has been able to overcome many of the difficulties which were still to be surmounted, and have decided that they will be able to revive the Show in 1947. For the convenience of exhibitors the Show will be for three days only, opening early on the morning of Wednesday, May 21 and, continuing on Thursday and Friday, May 22 and 23. In view of the shortage of labour and fuel and the depletion of nursery stocks as a result of the valuable contribution which nurserymen made to the national food supply during the war, the exhibits will naturally not be on the same scale as those of 1939. The Council is confident, however, that exhibitors will stage a display worthy of British horticulture and that Fellows and the gardening public generally will know how to make allowances and to show their appreciation of all that nurserymen and seedsmen have done for British horticulture.

The programme of shows for 1947 will be similar to that in the past year, but there will be no Show in the Halls during May because Chelsea Show is being resumed.

The Council is also planning an Early Market Produce Show, which is intended to demonstrate that the horticultural trade in this country can grow early vegetable produce of a high quality. The National Farmers' Union is co-operating whole-heartedly in the staging of this Show, by which it is hoped to show that " Britain Can Grow It " as well as that " Britain Can Make It." This Show will take place in conjunction with the Society's Fortnightly Show on April 29 and 30.

Another special Show which is being contemplated is a Show of Horticultural Machinery suitable for the private garden in conjunction with the Society's Fortnightly Show on April 1 and 2.

In view of the shortage of labour in private gardens and the great need for labour saving devices the Council is anxious to give every possible encouragement to the development and production of suitable machines and appliances, and to bring to the notice of horticulturists such machines and appliances as are already on the market. It is also proposed to invite manufacturers to demonstrate their machines at Wisley a fortnight later and it is hoped to make arrangements for a service of coaches between Vincent Square and Wisley on April 16 so as to enable those who come to London for the Society's Show on April 15 and 16 to travel easily to the demonstration at Wisley as well.

An Exhibition of Municipal Horticulture is also being planned. Great progress has been made in recent years in the provision and development of public parks and open spaces. In the future, Municipal horticulture will undoubtedly play an increasingly important part in the life of the community. This development is welcomed by the Council, who have consulted the representatives of many of the leading Municipalities throughout the country, and have decided to stage an Exhibition of Municipal Horticulture in collaboration with these Municipalities, in order to foster public interest in these activities. This Exhibition has been arranged to take place in the Old Hall at the same time as the Society's Show in the New Hall on September 9 and 10. The Institute of Park Administration is giving most valuable assistance in the preparatory work for this show.

The preliminary particulars of the Society's programme of Shows were published in the November number of the JOURNAL, and the dates will be printed on the tickets issued to Fellows. The first Show will take place on the occasion of the Annual Meeting on February 18.

The Council has again considered the possibility of keeping the Shows open until a later hour in the evening to meet the convenience of those Fellows who find it difficult to get to Westminster during business hours. Having regard to the wishes of exhibitors and other factors it has seemed best, at least for the coming year, to adhere to the present closing hours, namely 6 P.M. on the first day and 5 P.M. on the second.

Lectures and Lantern Slides.—The demand for the loan of lantern slides, with accompanying lectures, and the photographic exhibits has continued, and the slides have proved very popular wherever they have been shown.

Wisley: the Gardens.—With the gradual return to more normal conditions it has been possible to make a start with a number of improvements in the Gardens which have been held up by the War. For example, considerable thinning out of trees has been carried out on Battleston Hill, preparatory to planting a representative collection of Rhododendron species arranged in series, extending the collection of hybrids, and establishing a "carpet" of Kurume Azaleas. The ground set aside for plants which have received the "Award of Garden Merit" is being extended and restocked, the Pinetum cleared of bushes, and part of the Wild Garden replanted with Primulas. The Annual Border was sown again for the first time since the War. The Council wishes to express its thanks for the many generous donations of seeds and plants, both to the Gardens and for distribution to Fellows.

Owing to improved transport facilities, the number of visitors to the Gardens again increased, and a welcome feature was the large number of overseas horticulturists and botanists visiting Wisley once again after their enforced absence.

The demonstrations held in the Gardens were well attended and the programme will be repeated in 1947.

Floral and Vegetable Trials.—During the year the following Floral Trials were continued : Bearded Iris, Delphinium, Border Carnations, Dahlias, Dianthus, Eschscholzias, Early Flowering Chrysanthemums, Narcissus and Hybrid Rhododendrons. The Invited Vegetable Trials comprised Broad Beans, Early Culinary Peas, Leeks, Spinach and Spring-sown Onions. The Society, as in previous years, undertook, at the request of the Ministry of Agriculture, a large series of trials of vegetables from seed which had been imported by the Seeds Import Board. The Council desires to record its special thanks to Messrs. J. S. Cracknell, W. F. Giles, F. G. Potter and N. L. Tether, who acted as judges and advisers at these trials. The trials will be undertaken again on behalf of the Government during 1947.

National Fruit Trials.—There has been no material alteration to the area occupied by trials other than the planting of about an acre and a half which leaves no further land available. The total area is now approximately 42 acres. Frost damage at the flowering period this year did considerable damage to the bush fruits and also to Plums and Pears, but most varieties of Apples cropped heavily, including some promising new varieties. Propagating material of a number of new varieties has been received, and other new varieties have been planted for trial purposes.

The trials are conducted jointly by the Royal Horticultural Society and the Ministry of Agriculture, and are run primarily for the needs of the commercial grower and preserving industry. Nevertheless, Fellows of the Society together with others interested in fruit growing are finding the trials and collections of much value for their purposes, and there has been a marked increase in the numbers of both commercial and amateur growers visiting the grounds. Approximately 1,300 varieties are represented in the collections of hardy fruits ; these collections are maintained for purposes of comparison and classification.

School of Horticulture.—As from April the courses of instruction for young gardeners ceased in order to allow for the commencement of the Ministry of Agriculture's Vocational Training Scheme for ex-servicemen whose horticultural training has been interrupted by the war. Twenty-three trainees began their one-year course in April and a further sixteen in October. Eight Student Gardeners also commenced a two-year course in October.

The practical examinations for the National Diploma in Horticulture and for the Teachers' Certificate were again carried out in the Gardens.

Advisory Work.—The volume of inquiries continues to increase, especially in regard to ornamental plants.

Investigations. 1. Physiology.—(*a*) A report on the Onion Sets investigation was submitted to the Agricultural Research Council.

(*b*) A report on the tests carried out on the selective weed-killer, Methoxone, was published in the JOURNAL for May.

2. Entomology.—Entomological research was carried out on :—

(*a*) The effect of the synthetic insecticides D.D.T. and Benzene hexachloride upon horticultural pests.
(*b*) The effect of the treatment of bulbs and herbaceous plants by warm water against Eelworm infections.
(*c*) The distribution of pests of ornamental plants, including trees, shrubs and herbaceous and alpine subjects.
(*d*) The effect of several new methods of garden pest control, including mechanical, chemical and physical measures.
(*e*) The biology of the Rose Leaf-Rolling Sawfly, and more effective methods of control against this pest.
(*f*) The factors governing fluctuations in Wasp populations.

3. Mycology.—(*a*) Tests of varieties of Antirrhinum for resistance to Rust disease (*Puccinia antirrhini*) were severely curtailed during the war but will now be renewed.

(*b*) Further tests on the use of disinfectants aimed at controlling Club Root disease in Brassicas are being planned.

(*c*) The investigation into the cause of Black Root Rot of Delphiniums which was abandoned for the duration of the war will now be re-opened.

(*d*) The interrupted study on the cause or causes of Wilt disease in Clematis has been renewed.

White Fly Parasite.—The distribution was continued, but fuel restrictions and limited accommodation for extensive breeding still keep the supply far below the demand.

Wisley Library and Herbarium.—Valuable additions to the Library during the year have been Jaubert & Spach's *Illustrationes Plantarum Orientalium*, Coste's *Flore de France*, and collections kindly presented by Professor F. E. Weiss and Mr. E. G. Baker.

Groups.—The Lily Group resumed its activities during the year. Its programme included an excursion to Mr. Walter Bentley's garden at Newbury, one lecture, two discussions and a brains' trust.

The Fruit Group, which was formed in the autumn of 1945, has proved very popular and now includes over 350 Fellows and Associates. Its programme in 1946 included two lectures, two discussions, a pruning demonstration, and two excursions, one to Mr. H. Mountain's orchard at Mayfield, and another to the Society's fruit plantations at Wisley. Some 60 Members also dined together in the restaurant of the Society's New Hall on the evening of the first day of the Autumn Fruit and Vegetable Show.

The Rhododendron Group, which has taken over the work of the Rhododendron Association, held a discussion on the occasion of the annual Rhododendron Competition.

Membership of these groups is open to all Fellows and Associates, without additional subscription. Those desiring to join should notify the Secretary, from whom programmes for 1947 may be obtained.

Examinations.—There was an increase in the number of entries for the Society's examinations: 1,247 as against 1,175 in 1945. Certificates were awarded to 277 Senior and 173 Junior candidates in the General Examination; to 107 in the Teachers' Preliminary Examination in School and Cottage Gardening, and to 10 in the Teachers' Advanced Examination. Twelve diplomas were awarded in the Final Examination for the National Diploma in Horticulture, and 42 candidates passed the Preliminary Examination.

The Examinations Board has completely revised the regulations and syllabuses for all the examinations, and the titles given below will be used in future:—

General Examination in Horticulture.
General Examination in Horticulture for Juniors.
Examination for Teachers of School Gardening.

The Sections in the Final Examination for the National Diploma in Horticulture have been changed to the following:—

Section I—General Commercial Horticulture.
II—Fruits in the Open.
III—Vegetables in the Open, in frames and under cloches.
IV—Crops under glass.
V—General Horticulture.
VI—Seed Production.
VII—Landscape Architecture.
VIII Public parks, grounds and open spaces.

Another examination entitled "National Diploma in Horticulture with Honours (N.D.H. (Hons.) Examination)" has also been instituted.

Lindley Library.—The Society's librarian has been released from the Forces, and, now that the staff of the Library has been increased to two, it is possible to keep the Library open during lunch hours. A start has been made on the revision of the Catalogue of the Library. Many additions have been made to the Library since the last catalogue was issued and it is hoped to produce in the course of the next two or three years a new addendum to the Catalogue of the Library, which will bring it completely up to date.

Among the 180 books added to the Lindley Library since December 1945, may be mentioned *Plantes et Arbustes d'Agrément* (1791); Rafinesque, *Flora Telluriana* (1837–38, facsimile); Rafinesque, *New Flora* (1836–38, facsimile); and Nordhagen, *Norsk Flora* (1943), purchased by a donation from the Earl of Buchan; Makino and Nemoto, *Flora of Japan*, 2nd ed. (1931); and Nemoto, *Flora of Japan Supplement* (1936), purchased by a donation from Mrs. G. E. Ratcliff; Krelage, *Drie Eeuwen Bloembollenexport* (1946), presented by the author; Hultén, *Flora of Alaska and Yukon*, Parts 1–5 (1941–5); Fang, *Icones Plantarum Omeiensium*, Vol. 2, Parts 1 and 2 (1945–46); and Krauss, *Afbeeldingen der Fraisste xxx Boomen en Heesters* (1802).

The loan service provided by the Library is well patronized by Fellows.

Publications.—The Society's publications have been continued. The *Study of the Genus Paeonia* by Colonel F. C. Stern has been published, and work is proceeding on the *Monograph of Anemones* by E. A. Bowles. The Daffodil and Tulip Year Book, the Lily Year Book and the Rhododendron Year Book have been published and it is anticipated that the Rhododendron Handbook will appear shortly. This will contain the lists of Rhododendrons and other material formerly published in the Year Book of the Rhododendron Association. The JOURNAL has been slightly enlarged during 1946 and will be still further enlarged in 1947 with the addition once a quarter of colour plates. Several of the lectures and articles in the JOURNAL have been reprinted in pamphlet form and reprints of former pamphlets have been issued. The publication *Some Good Garden Plants* has been completely revised and re-issued. It is expected that a Guide to Wisley Gardens will be issued early in 1947. Progress has continued with the Society's Dictionary of Gardening, but no date for publication can be yet announced.

Obituary.—It is with deep regret that there has to be recorded the death of a number of distinguished horticulturists. From holders of the Victoria Medal of Honour are:—Mr. W. D. Besant, Mr. H. R. Darlington and Mr. D. Ingamells; from the Honorary Fellows of the Society: Mrs. A. Sherman Hoyt, Mr. F. J. Baker, M. Désiré Bois and Mr. E. Waller; from Associates of Honour:—Mr. E. U. Brew, Mr. Wm. Craven, Mr. R. H. Holton, Mr. A. Macrae, Mr. H. J. Moore, Mr. G. Nobbs, Mr. S. Radley, Mr. J. Rogers, Mr. R. K. Sillars, Mr. S. Smith, Mr. C. Street, Mr. J. E. Vine and Mr. A. B. Wadds. Mention must also be made of Dr. E. F. Armstrong and Mr. Hugh Wormald, who were Members of the Scientific Committee and Narcissus and Tulip Committee respectively; Mr. G. H. Dalrymple; Mr. J. M. Black, the well-known Orchid nurseryman; Mr. H. T. Wilkin of Carters Tested Seeds Ltd.; and Mr. Wm. Judd, of the Arnold Arboretum, who did so much to introduce new plants to gardens.

The Victoria Medal of Honour.—The Victoria Medal of Honour has been awarded to Mrs. Vera Higgins, M.A., F.L.S., a keen amateur gardener, who has made valuable contributions to horticultural literature; to Professor F. E. Weiss, D.Sc., LL.D., F.R.S., F.L.S., who has been of great assistance to the Society in connection with its scientific work and its examinations; and to Mr. Bernard Rochford, who has rendered signal service to commercial growers of glasshouse crops.

Associates of Honour.—The Associateship of Honour has been awarded to Mr. F. A. Bush, formerly head gardener at Dell Park, Englefield Green; to Mr. L. J. Cook of the Stuart Low Co.; to Mr. W. G. Creasey of Messrs. John Rochford & Sons, Ltd.; to Mr. C. J. Dew, of Messrs. Geo. Monro, Ltd.; to Mr. S. M. Gault, head gardener at St. Andrew's Hospital, Northampton; to Mr. J. M. Grant, head gardener at Grayswood Hill; to Mr. G. Miller, head gardener at Bayham Abbey; to Mr. W. Nelmes, M.B.E., Superintendent of Parks at Cardiff; to Mr. J. Richardson, Superintendent of Parks at Manchester; to Mr. Wm. Robinson, Curator of the University Botanic Garden, Oxford; to Mr. Roland Smith, head gardener at Weston Hall; and to Mr. A. W. Witt, formerly at the East Malling Research Station.

The Veitch Memorial Medal.—Awards have been made as follows: A Gold Medal to Mr. R. L. Harrow, V.M.H., for his general services to horticulture and also for the work he has accomplished while Director of the Society's Gardens; a Gold Medal to Mr. F. C. Puddle, V.M.H., for his services to horticulture in the hybridization and the development of new plants of garden merit; and a grant of fifty guineas to Miss L. Snelling, a recipient of a Silver Veitch Memorial Medal in 1924, in recognition of her further services to botany and horticulture as an illustrator in the *Botanical Magazine* and other publications.

The Lawrence Medal.—The Lawrence Medal has been awarded to Mr. Stuart Ogg, for his exhibit of Dahlias shown on September 24, 1946, which was considered to be the best exhibit shown to the Society during the year.

The Holford Medal.—The Holford Medal has been awarded to Lord Aberconway, C.B.E., V.M.H., for his exhibit of Cypripediums, shown on October 22, 1946, which was considered to be the best exhibit of plants and/or flowers shown by an amateur during the year in the Society's Halls.

The Sander Medal.—The Sander Medal has been awarded to Messrs. Allwood Bros. for Perpetual-flowering Carnation 'Royal Crimson.' shown on November 5, 1946, which was considered to be the best new greenhouse plant of general utility shown to the Society during the year.

The George Moore Medal.—The George Moore Medal has been awarded to Sir William Cooke, Bt., D.L., for his Cypripedium 'Denehurst,' 'Wyld Court var.' shown on February 19, 1946, which was considered to be the best new Cypripedium shown to the Society during the year.

The Williams Memorial Medal.—The Williams Memorial Medal has been awarded to Messrs. Blackmore and Langdon for their exhibit of Cyclamens shown on November 5, 1946, which was considered to be the best group of plants and/or cut blooms of one genus which showed excellence in cultivation, shown during the year.

The Reginald Cory Memorial Cup.—The Reginald Cory Memorial Cup for the raiser of the best new hardy hybrid of garden origin shown to the Society in the course of the year has been awarded to Mr. A. Burkwood for *Viburnum Carlcephalum* shown on April 16, 1946.

Gifts to the Society.—The Council desires to express its gratitude to the Society's Fellows and friends for gifts of plants and seeds, and for valuable contributions to the Library; and especially to Mr. John Gray for the gift of a portrait in oils of Mr. E. A. Bowles, V.M.H.

Council.—The Council wishes to express its gratitude to the retiring members, Mr. A. Cheal and Mr. W. R. Oldham, both of whom have rendered most valuable service to the Society. It is satisfactory to note that their advice is still available on the various committees of which they are members.

The Press.—The Council desires to record its gratitude to the Press for their friendly support and goodwill, and for their constant interest in the affairs of the Society.

Committees, Judges, Examiners, and Lecturers.—The Council is deeply appreciative of the work which has been performed by the many members of the various committees, the judges, the examiners and the lecturers. It is especially appreciated that the calls of the Society have often encroached extensively upon their leisure, and the Council is very grateful to them for having given their time and services without stint.

Staff : Vincent Square.—At the end of March the Society suffered a severe loss in the retirment, due to ill-health, of its Secretary, Lt.-Col. F. R. Durham, C.B.E., M.C., who had served with outstanding ability and devotion for twenty years. The Council wishes to record its most sincere appreciation of all the work which Colonel Durham did for the Society during his tenure of office. He has been succeeded by Brigadier C. V. L. Lycett.

Wisley.—As was forecast in the last annual Report, the Director of the Society's Gardens, Mr. R. L. Harrow, retired in May. The Society has been very fortunate in securing the services of Mr. J. S. L. Gilmour in his place. Mr. Gilmour had previously been Assistant Director at Kew. The Council wishes to express its appreciation to the Director of the Royal Botanic Gardens for his kindness in releasing Mr. Gilmour to the service of the Society. The Keeper of the Laboratory, Dr. M. A. H. Tincker, resigned his appointment at the end of September. The Council wishes to express its appreciation for his services on the scientific side of the Society's work, and also for his invaluable help on connection with the Society's examinations.

Mr. J. M. S. Potter, the Society's pomologist at Wisley, has been released from his contract with the Society in order to take over a position in the National Advisory Service of the Ministry of Agriculture and Fisheries to supervise the National Fruit Trials. Mr. Potter will, however, fortunately continue to be very closely associated with the fruit work at Wisley. His position has been taken over by Mr. J. W. Bultitude, who has just rejoined the Society after service with the Forces.

The Council has also been fortunate in obtaining for Wisley the services of Dr. Janaki Ammal, who has been working at Kew. Dr. Ammal is an outstanding authority on Chromosomes and is the joint author of *Chromosome Atlas of Cultivated Plants.* It is hoped that her work will be productive of new forms of plants which will be of value to horticulture. As was forecast in last year's report, Mr. J. W. Blakey retired from his position as Curator of the Gardens and was succeeded on February 5, by Mr. F. E. W. Hanger. The Council wishes to express its appreciation of all the work done by Mr. Blakey in developing the Gardens at Wisley.

The Council desires to express to the Society's Secretary and his staff at Vincent Square and to the Director and his staff at Wisley its most cordial thanks for their loyalty and valuable work during the past year.

Signed on behalf of the Council,
ABERCONWAY,
President.

December 31, 1946.

Dr. **ANNUAL REVENUE & EXPENDITURE ACCOUNT**

1945 £	 £		£ s. d.	£ s. d.
		To London—		
		Establishment Expenses less Allocations—		
3,187		Rent, Rates and Taxes	3,732 13 2	
9,114		Salaries, Wages & Gratuities to Retiring Staff	11,935 9 4	
4,798		Other Establishment Expenses, including Light, Fuel, Stationery, Professional Fees, and Renewals	5,816 2 6	
	17,099			21,484 5 0
		„ Wisley—		
	13,886	Net Expenditure for Year, as per separate Account		21,181 11 1
		„ Printing and Postage of Publications—		
7,720		Journal	9,091 13 5	
2,319		Other Publications	1,428 18 6	
10,039			10,520 11 11	
3,561		*Less* Sales and Advertisements . .	4,367 11 8	
	6,478			6,153 0 3
1,105		„ Staff Pensions	1,312 2 0	
445		*Less* Contributions by Staff as per Scheme .	582 17 9	
	660			729 4 3
		„ Meetings—		
2,884		Expenses, Labour and Overheads of Special and other Meetings	5,182 11 9	
968		*Less* Receipts	2,490 4 6	
	1,916			2,692 7 3
	33	„ Cups and Medals		192 8 7
		„ Contributions to Lindley Library, as per Trust Account—		
198		Purchase of Books	222 18 2	
289		Salaries, etc.	509 9 5	
	487			732 7 7
		„ Special Expenditure—		
		Donation–Gardeners' Royal Benevolent Inst.	52 10 0	
		„ Royal Gardeners' Orphan Fund	21 0 0	
		„ British Colour Council .	5 5 0	
		„ Royal Geographical Society	10 0 0	
		„ Roads Beautifying Assoc. .	50 0 0	
		„ Robert Lloyd Praeger Fund	10 0 0	
		Expeditions–Mr. Kingdon Ward .	10 10 0	
		Syria	5 5 0	
		Algeria . . .	25 0 0	
	162			189 10 0
115		„ Botanical Magazine	240 8 3	
315		*Add* Work in Advance	300 0 0	
	430			540 8 3
		„ Examinations in Horticulture—		
863		Expenses	1,201 7 9	
810		*Less* Fees	887 8 6	
	53			313 19 3
	-	General Scholarships (not awarded) . .		- - -
	3,366	„ Old and New Halls Sinking Fund Appropriation		3,366 0 0
		„ Restaurants—		
	635	Expenses, including Proportion of Overheads, *less* Receipts		825 11 6
	-	„ Provision for Deferred Repairs . .		6,000 0 0
		„ Balance, being Excess of Revenue over Expenditure, added to General Reserve . .		10,976 14 4
	£45 205			£75,377 7 4

FOR THE YEAR ENDED 31st DECEMBER, 1946 Cr.

1945 £	£		£	s.	d.	£	s.	d.
	37,641	By Annual Subscriptions and Donations .				62,198	4	0
1,597		„ Dividends and Interest	2,121	10	10			
43		„ Do. Do. Davis Trust . .	43	1	8			
35		„ Deposit Interest . . .	82	2	2			
	1,675					2,246	14	8
	1,738	„ Hall Lettings, Gross . . .				10,063	6	11
	294	„ Life Compositions— Being amounts paid by Fellows who have died during the year				493	10	0
	383	„ Rent of Freehold Property (Wisley)				375	11	9
	3,474	„ *Balance being Excess of Expenditure over Revenue deducted from General Reserve* .						
	£45,205					£75,377	7	4

LIABILITIES.

1945 £	£		£	s.	d.	£	s.	d.
	250,000	ACCUMULATED FUNDS ACCOUNT				250,000	0	0
17,299		LIFE COMPOSITIONS as at 31st December, 1945 .	25,058	5	0			
294		*Less* Fees paid by Fellows who have died during the year	493	10	0			
17,005			24,564	15	0			
8,054		*Add* Life Compositions received during the year	3,803	12	0			
	25,059					28,368	7	0
		PROVISION FOR DEFERRED REPAIRS—LONDON	6,000	0	0			
		WISLEY	3,000	0	0			
						9,000	0	0
	6,873	SUNDRY CREDITORS				8,463	7	2
	8,985	SUBSCRIPTIONS IN ADVANCE . . .				2,326	12	0
	10,000	DEPRECIATION AND RENEWALS FUND . .				10,000	0	0
57,733		OLD AND NEW HALLS SINKING FUND . .	62,798	13	11			
57,733		Deducted *per contra*	62,798	13	11			
	-					-	-	-
	3,608	SHOWS CONTINGENCY FUND . .				3,704	1	3
	7,858	*Supplementary Pension Fund* . . .						
	500	LEGACIES: DAME JULIA M TILDEN	500	0	0			
	500	MRS. A. C. CHARRINGTON .	500	0	0			
		These legacies will be applied to the cost of "A Study of the Genus Paeonia"				1,000	0	0
		MEMORIAL AND OTHER TRUST FUNDS—						
	910	Balances of Income Accounts in the hands of the Society, as per Separate Schedule . .				706	12	1
		GENERAL RESERVE—						
34,756		Balance as at 31st December, 1945 . .	31,661	7	1			
379		*Add* Surplus on Realisation of Investments .	381	14	6			
Less *3,474*		Balance of Revenue and Expenditure Account, 31st December, 1946	10,976	14	4			
	31,661					43,019	15	11
	£345,954					£356,648	15	8

I have audited the above Balance Sheet, dated 31st December, 1946, and have obtained all the information and explanations I have required. In my opinion such Balance Sheet is properly drawn up so as to exhibit a true and correct view of the state of the Society's affairs according to the best of my information and the explanations given to me and as shown by the books of the Society.

F. G. FEATHER, F.C.A., *Auditor.*
(HARPER, FEATHER & PATERSON, *Chartered Accountants*),
4 Lloyds Avenue, London, E.C. 3.

14*th January*, 1947.

BALANCE SHEET, 31st DECEMBER, 1946

1945 £	£	ASSETS	£	s.	d.	£	s.	d.
77,642		OLD HALL, OFFICES, RESTAURANT, LIBRARY, AND EQUIPMENT AT COST	77,642	0	0			
167,706		NEW HALL, RESTAURANT AND EQUIPMENT AT COST	167,706	2	10			
245,348			245,348	2	10			
57,733		*Less* Old and New Halls Sinking Fund *per contra*	62,798	13	11			
	187,615					182,549	8	11
		OLD AND NEW HALLS SINKING FUND INVESTMENTS AT COST—						
52,855		As at 31st December, 1945	57,732	19	4			
4,878		Additions during the year . . .	5,065	14	7			
	57,733					62,798	13	11
		(Market Value at 31st December, 1946, £67,725 8 8)						
		FREEHOLD PROPERTY, WISLEY—						
	13,105	At Cost, *less* amounts written off . .				13,105	2	11
		BOTANICAL MAGAZINE—						
	100	Stock				100	0	0
		DEPRECIATION AND RENEWALS FUND INVESTMENTS						
	10,000	AT COST				10,000	0	0
		(Market Value at 31st December, 1946, £10,854 11 10)						
		SHOWS CONTINGENCY FUND INVESTMENTS AT COST—						
3,515		As at 31st December, 1945	3,608	4	7			
93		Additions during the year	95	16	8			
	3,608					3,704	1	3
		(Market Value at 31st December, 1946, £4,096 14 7)						
		SUPPLEMENTARY PENSION FUND INVESTMENTS AT COST—						
	7,858	As at 31st December, 1945 . . .	7,858	1	4			
		Less Transferred to Beneficiary . .	7,858	1	4			
						-	-	-
		LEGACY INVESTMENTS—						
	1,000	AT COST				1,000	0	0
		(Market Value at 31st December, 1946, £1,102 10 0)						
		GENERAL INVESTMENTS AT COST—						
48,112		As at 31st December, 1945 . . .	48,491	6	5			
379		Additions during the year	15,381	14	6			
	48,491					63,873	0	11
		(Market Value at 31st December, 1946, £67,650 9 2)						
	491	WISLEY ADJUSTMENT ACCOUNT . . .				454	15	7
		R.H.S. DICTIONARY OF GARDENING—						
	1,662	Expenditure to date (in suspense) . .				1,882	12	2
	6,167	SUNDRY DEBTORS AND PAYMENTS IN ADVANCE .				8,716	9	0
	8,124	CASH AT BANK AND IN HAND . .				8,464	11	0
	£345,954					£356,648	15	8

Dr. WISLEY GARDENS—REVENUE & EXPENDITURE

1945 £	£		£ s. d.	£ s. d.
		To ESTABLISHMENT EXPENSES—		
2,624		Salaries, Wages, Gratuities to Retiring Staff and Redemption of forfeited Pension Rights	5,898 5 8	
534		Rates, Taxes and Insurances	561 10 3	
1,289		Miscellaneous, including Donations	1,985 4 1	
159		Annuities	158 12 0	
	4,606			8,603 12 0
		,, LABORATORY AND SCHOOL OF HORTICULTURE—		
3,208		Salaries and Wages	3,437 12 0	
55		Miscellaneous	105 12 1	
41		Depreciation	36 4 0	
	3,304			3,579 8 1
		,, GARDEN—		
7,692		Salaries and Wages	8,650 8 9	
311		Seed Distribution *less* Receipts	333 3 10	
982		Miscellaneous	2,486 1 9	
286		Depreciation	302 15 11	
	9,271			11,772 10 3
558		,, STAFF PENSIONS	909 13 4	
279		*Less* Contributions by Staff, as per Scheme	436 6 8	
	279			473 6 8
	£17,460			£24,428 17 0
	13,816	To BALANCE, brought down		£17,770 17 1
	70	,, SPECIAL EXPENDITURE—		
		Overhead Sprinklers	130 14 0	
		Renewal of Boiler	280 0 0	
		Provision for Deferred Repairs	3,000 0 0	
				3,410 14 0
	£13,886			£21,181 11 1

ACCOUNT FOR THE YEAR ENDED 31st DECEMBER, 1946 Cr.

1945 £		£	s.	d.
1,015	By DIVIDENDS AND INTEREST . .	1,025	10	2
	„ GARDEN—			
2,629	Sales and Miscellaneous Receipts .	5,632	9	9
13,816	„ BALANCE, carried down .	17,770	17	1
£17,460		£24,428	17	0
13,886	By BALANCE, being Net Expenditure for the Year, carried to the Annual Revenue and Expenditure Account . . .	21,181	11	1
£13,886		£21,181	11	1

WISLEY GARDENS—BALANCE

1945 £	LIABILITIES.	£	s.	d.
34,545	Accumulated Funds Account	34,545	10	0
491	Vincent Square Adjustment Account	454	15	7
24,666	Endowment Trust Fund	24,666	3	11
11,031	Depreciation and Renewals Fund	11,280	10	2
£70,733		£70,946	19	8

SHEET, 31st DECEMBER, 1946

1945 £	£	ASSETS	£ s. d.	£ s. d.
	33,371	LABORATORY, DWELLING HOUSES, GLASS HOUSES, RANGES, ETC., AT COST . . .		33,371 10 10
		N.B.—The Hanbury Trust Estate is, under the Trust Deed, vested in the Society only so long as it is in a position to use it as an Experimental Garden Accordingly the Expenditure thereon by the Society is an Asset only so long as the Gardens continue to be used by the Society.		
	245	FUEL STOCK (valued by the Director) . .		242 6 4
		PLANT AND LOOSE EFFECTS (valued by the Director)—		
1,485		As at 31st December, 1945 . . .	1,420 11 2	
30		*Add* Purchases during the year	54 17 2	
1,515			1,475 8 4	
95		*Less* Depreciation of Garden and Laboratory Effects . . .	88 19 11	
	1,420			1,386 8 5
	24,666	ENDOWMENT TRUST FUND INVESTMENTS AT COST (Market Value at 31st December, 1946, £26,883 1 2)		24,666 3 11
		DEPRECIATION AND RENEWALS FUND INVESTMENTS AT COST—		
10,686		As at 31st December, 1945	11,030 10 2	
345		Additions during the year	250 0 0	
	11,031			11,280 10 2
		(Market Value at 31st December, 1946, £13,364 1 8)		
	£70,733			£70,946 19 8

I have audited the books from which the foregoing Accounts are compiled, and certify that they exhibit a true and correct statement of the position on the 31st December, 1946 In the total of Assets, £70,946 19*s*. 8*d*., are included Investments, amounting to £35,946 14*s*. 1*d*, representing Endowment and Depreciation Funds which are not available for the general purposes of the Society.

F. G. FEATHER, F C.A, *Auditor*
(HARPER, FEATHER & PATERSON, *Chartered Accountants*),
4 Lloyds Avenue, London, E C 3

14th January, 1947

ROYAL HORTICULTURAL SOCIETY—TRUST FUND ACCOUNTS, 31st DECEMBER, 1946

	Amount of Fund represented by Investments at Cost. £ s. d.	Income Balance in hand 31st Dec. 1945. £ s. d.	Income received during 1946. £ s. d.	Expenditure in 1946 in accordance with the Trust. £ s. d.	Income Balance in hands of R.H.S. 31st Dec. 1946. £ s. d.
1. ALFRED DAVIS TRUST FUND	1,049 9 2	*nil*	43 1 8	43 1 8	*nil*
2. WILLIAMS MEMORIAL FUND	258 15 4	57 9 1	8 17 9	*nil*	66 6 10
3. MASTERS MEMORIAL FUND	542 17 0	212 16 2	20 0 0	232 16 2	*nil*
3A. MASTERS MEMORIAL LECTURE EXPENSES	200 0 0	12 16 2	2 10 1	11 4 3	4 2 0
4. NICHOLSON MEMORIAL FUND	202 2 2	*nil*	5 4 0	5 4 0	*nil*
5. SCHRÖDER PENSION FUND	557 14 6	6 6 8	20 0 0	20 0 0	6 6 8
6. LINDLEY LIBRARY TRUST FUND	17,492 10 9 (*a*)	*nil*	556 6 1 (*c*)	556 6 1	*nil*
7. SIR JAMES KNOTT TRUST	600 0 0	198 13 3	25 3 0	*nil*	223 16 3
8. VEITCH MEMORIAL TRUST FUND	1,742 0 11	104 16 0	44 4 4	29 15 2	119 5 2
9. MOORE MEDAL TRUST	190 10 6	46 17 11	7 16 6	3 10 0	51 4 5
10. SEWELL MEDAL TRUST FUND	532 14 4	117 8 11	15 8 5	3 19 6	128 17 10
11. MRS. SHERMAN HOYT PRIZE FUND	208 1 2	79 10 10	6 4 10	27 0 0	58 15 8
12. LORD RIDDELL TROPHY FUND	222 12 11	6 9 4	5 19 0	7 0 0	5 8 4
13. DEDICATIONS VOLUME FUND (Botanical Magazine)	279 19 5	*nil*	8 8 0	8 8 0 (*d*)	*nil*
14. THE COLMAN FUND	1,501 10 0	*nil*	39 14 1	39 14 1 (*d*)	*nil*
15. P. D. WILLIAMS FUND	372 7 9	54 0 8	10 19 5	8 9 0	56 11 1
16. THE GLAZEBROOK FUND	100 0 0	25 13 4	3 6 3	*nil*	28 19 7
17. CORY BEQUEST TO LINDLEY LIBRARY	747 13 3 (*b*)	*nil*	24 0 0	24 0 0	*nil*
18. A. J. WALEY MEDAL FUND	131 3 10	13 19 0	2 19 1	*nil*	16 18 6
				Total as per Balance Sheet	£766 12 4

	£ s. d.
(*a*) Investment	1,509 10 2
Cost of books purchased by Society to 31st Dec., 1945	15,760 2 5
Books purchased by Society in 1946	222 18 2
	£17,492 10 9
(*b*) Balance of Cory Bequest at 31st Dec., 1945	723 13 3
Add Interest received and added to Fund	24 0 0
	747 13 3
Less books purchased in 1946	*nil*
Balance at 31st Dec., 1946	£747 13 3

(*c*) Includes contribution by the Society in 1946 £509 9*s*. 5*d*.

(*d*) Income added to Fund and re-invested.

Notes on above Funds·

1. Bequeathed to the Society in 1870 for annual prizes or any other object the Council may determine. 2. Raised by donations in 1891 in memory of the late Mr. B. S. Williams towards the provision of prizes and medals. 3. Raised by donations in 1908 in memory of the late Dr Masters towards the provision of one or more annual lectures. 3A. The accumulated income of the Masters Memorial Fund at 31st December, 1945, was transferred during 1946 to a Fund to defray the expenses of the Lecturer 4 Raised by donations in 1908 in memory of the late Mr. George Nicholson to provide prizes for Wisley students. 5. Provided by the Society in memory of the late Baron Schröder to pay to the Gardeners' Royal Benevolent Institution for one pension. 6 The nucleus of the library is the fine collection of books and pamphlets which belonged to the late Dr Lindley It has since been added to by the books purchased by the Society and by the gifts of the late Mr Reginald Cory and of private donors. 7. Presented to the Society in 1920 by the late Sir James Knott for the purpose of providing a scholarship tenable at Wisley. 8. Instituted in 1870 in commemoration of the late Mr James Veitch for the encouragement of Horticulture. Fund vested in the Society in 1922 9 Presented to the Society in 1926 by the late Mr G F Moore to provide a medal annually for the best new Cypripedium shown to the Society during the year. 10 Presented to the Society in 1928 by the late Mr. A J Sewell to provide medals for Rock Garden Plants. 11 Presented by Mrs. A. Sherman Hoyt in 1920 as a donation and funded by the Society to provide prizes for the encouragement of the growth of Cacti and Succulents. 12. Presented by the late Lord Riddell in 1931 to provide a trophy annually to be awarded for vegetables 13. Proceeds of the sale of Curtis's Botanical Magazine Dedications, 1827–1927, presented in 1932 to the Society by the late Mr William Cuthbertson, to be devoted to publications. 14. Presented to the Society in 1935 by Sir Jeremiah Colman, Bt., V.M.H., to be used for the improvement of flowers or fruit 15 Raised in 1936 by donations to provide medals to commemorate the late Mr P D. Williams and to encourage the cultivation and improvement of Daffodils and Rhododendrons. In 1937 the Society made a grant of £75 to cover the cost of medal design and dies. 16 Bequeathed to the Society in 1938 by the late Mr H de T. Glazebrook to provide prizes at the Society's shows. 17 Proceeds of the sale of duplicate books being part of the bequest of the late Mr. Reginald Cory to the Lindley Library (referred to under No 6), held, for the time being, in trust by the Society for the purchase of further books. 18. Instituted by Mr. Alfred J. Waley in 1937 to provide an Annual award to any working gardener who has helped the cultivation of Rhododendrons. Fund vested in the Society in 1940.

GENERAL MEETINGS.

JULY 2, 1946

FRUIT AND VEGETABLE COMMITTEE.—Mr. F. A. SECRETT, V.M.H., in the Chair, and thirteen other members present.

Awards Recommended:

Award of Merit.

To Cherry 'Merton Heart' formerly No. 404, (Bigarreau Schrecken × Elton) (votes unanimous), raised at the John Innes Horticultural Institute and recommended for award after trial at the Kent Farm Institute, Sittingbourne.

To Seedling No 185 (Knights Early Black × Big Schrecken) (subject to naming, votes unanimous), from The Principal, Kent Farm Institute, Sittingbourne.

To Seedling No 418 (Emperor Francis × Bedford Prolific) (subject to naming, votes unanimous), from The Principal, Kent Farm Institute, Sittingbourne.

To Seedling No 490 (Elton × Big Schrecken) (subject to naming, votes unanimous), from The Principal, Kent Farm Institute, Sittingbourne.

Other Exhibits.

Seedling Strawberry from Miss Coker, Lane End, Mayfield, Sussex.

SEPTEMBER 17, 1946

JOINT EARLY-FLOWERING CHRYSANTHEMUM COMMITTEE.—Mr. G. W LEAK, V M H., in the Chair, and thirteen other members present.

Awards Recommended:

Award of Merit.

To 'Amber Vale,' for exhibition (votes 9 for, 0 against); 'Bulwark,' for exhibition (votes 11 for, 0 against), shown by Messrs J. & T. Johnson, Tibshelf, Derbyshire.

To 'Betty Riley,' for exhibition (votes 9 for, 1 against), shown by Mr. E. Riley, Brookside Nurseries, Alfreton, Derbyshire.

To 'Cream Duchess,' for exhibition (votes 8 for, 2 against), shown by Messrs Johnson (Florists) Ltd, Forge Nurseries, Burton-on-Trent

To 'Yellow Corona' (votes 10 for, 0 against), shown by Messrs J. and T. Johnson, Tibshelf, Derbyshire.

Selected for trial at Wisley.

'Betty Riley,' shown by Mr. M. E Riley, Alfreton, Derbyshire.

'Patricia' and 'Yellow Spur,' shown by Mr H. Lowe, Vicar Lane Nurseries, Tibshelf, Derbyshire.

'Amber Vale,' 'Bulwark,' 'Golden Chance,' 'Sweet Sue' and 'Yellow Corona,' all shown by Messrs J. & T Johnson, Tibshelf, Derbyshire.

'Cream Duchess' and 'Golden Dawn,' shown by Messrs. Johnson (Florists) Ltd, Burton-on-Trent.

'Christine Sweetheart,' shown by Mr J. E. Marsland, Clay Lane, Nursery, Timperley, Cheshire.

Other Exhibits.

'Coral Glow,' shown by Mr. E. Riley, Alfreton, Derbyshire.

'Bronze Sweetheart' (previously selected for trial), shown by Messrs. J. & T. Johnson, Tibshelf, Derbyshire.

'Alexander Winton,' shown by Mr. Alex. McAlpine, Braidfauld Nurseries, Tollcross, Glasgow.

'Duchess,' shown by Messrs Johnson (Florists) Ltd, Burton-on-Trent.

'Lyric' (to be seen again), shown by Mr J Shoesmith, Mayford, Woking, Surrey.

'Blenheim,' shown by Messrs G. Wilson & Clarke, Blenheim Nursery, Granville Road, Cricklewood, N W 2

'Florence Meridan,' shown by E. W. Hodsdon, Esq., 8 Trinder Road, Barnet, Herts.

'Richard Hicks' and 'Evening Glow,' shown by Mr. H. Lowe, Tibshelf, Derbyshire.

'Primrose Alabaster,' shown by Mr. W. H. Cole, The Nurseries, Sarisbury.

NOVEMBER 5, 1946.

SCIENTIFIC COMMITTEE.—Mr. E. A. BOWLES, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and six other members present.

Fasciated Cryptomeria.—Dr. Orr, of Edinburgh Botanic Garden, wrote concerning the specimen of fasciated *Cryptomeria japonica* shown at the last meeting: "I do not think it is the variety *cristata*, which Beissner now regards as synonymous with the variety *monstrosa* Hort. I am of the opinion that this fasciated form is the same as that which Camillo Schneider saw at Boskoop, and described in 'The Garden' of 17/7/26. According to Schneider, van Nes had named this var. *monstrosa* also. This form may be the variety *fasciata*, but the nomenclature of these varieties is somewhat puzzling. It is interesting to recall that in 1883 A. D. Webster of Penrhyn Castle exhibited fasciated forms of *Cryptomeria japonica* at the December meeting of the R.H.S."

Proliferous Cones of Cryptomeria japonica.—Commander Gilliland sent examples of cones of *Cryptomeria japonica* with the leafy axis prolonged beyond the apex of the cones. This condition is not infrequent in this plant and in the common Larch.

Mediterranean Fruit Fly.—Mr. G. F. Wilson showed an imago of the Mediterranean Fruit Fly raised from a grub found in a Spanish Orange. The larva feeds in the pulp and pupates outside the Orange. Mr. Wilson had tried repeatedly to breed the imago from larvae found in Oranges but until now had not succeeded. Considerable damage is done by this insect in South Europe.

Queen Ant in Potato.—A wingless queen ant found in a hole in a Potato was sent from a garden in Southampton. The ant had doubtless sought shelter in a hole made by some ground pest feeding in the tuber.

Crocus Aberrations.—Mr. E. A. Bowles showed a flower of *Crocus speciosus Aitchisonii* with 8 perianth pieces, 4 stamens and 4 style arms, and one with 12 perianth pieces, 6 stamens and irregularly divided style arms He had not previously observed these aberrations in this variety in his garden

FRUIT AND VEGETABLE COMMITTEE.—Mr. F. A. SECRETT, V.M.H., in the Chair, and sixteen other members present.

Awards Recommended:

Silver Gilt Hogg Medal.

To H. H. Crane, Esq., Highmead, Cheney Lane, Eastcote, Pinner, for a collection of Apples.

Silver Hogg Medal.

To Mr J. Read, Hockley, Essex, for a group of Melons

Other Exhibits.

Collection of Apples and Pears grouped according to their chromosome number, from the Director, R H S Gardens, Wisley.

Apple 'Muriel' from Mr. G. W. Perry, Belmont House, Hillgrove Avenue, West Coker Road, Yeovil.

Seedling Apple from Mr H. P Burbidge, 63 Slewins Lane, Romford, Essex.

Seedling Apple from Mr J. R Crouch, Inisvouls, 14 Meon Road Bournemouth.

FLORAL COMMITTEE A.—Mr G W LEAK, V.M.H., in the Chair, and fourteen other members present.

Awards Recommended:

Gold Medal.

To Messrs. Blackmore & Langdon, Bath, for an exhibit of Cyclamens.

Silver-gilt Flora Medal.

To Messrs. Allwood Bros, Haywards Heath, for an exhibit of Carnations.

To Messrs. Napier, Taunton, for an exhibit of Carnations.

Flora Medal.

To Messrs. Biddlecombe Bros., Ltd., Bracknell, for an exhibit of Carnations

To Messrs. T. Carlile, Ltd., Twyford, for an exhibit of Chrysanthemums.

To Messrs. C. Englemann, Ltd, Saffron Walden, for an exhibit of Carnations.

To Messrs. A. R. Wills, Ltd., Romsey, for an exhibit of Cyclamens.

Banksian Medal.

To The Orpington Nurseries Co., Ltd., Orpington, for an exhibit of Korean Chrysanthemums.

To Messrs. Toogood & Sons, Ltd, Southampton, for an exhibit of *Primula obconica.*

To Messrs. Wheatcroft Bros., Ltd., Nottingham, for an exhibit of Roses.

Selected for trial at Wisley.

Korean Chrysanthemum 'Wedding Day,' from The Orpington Nurseries Co., Ltd., Orpington.

Other Exhibits.

Chrysanthemum, from E. J. F. Coleman, Esq., Mill Hill, N.W. 7.

Hippeastrums (to be seen again), from A. C. Buller, Esq., Dwarsriviershoek, Dist. Stellenbosch, Cape Province, South Africa. These bulbs were received at Wisley from South Africa on September 3, and were given hot water treatment at 110° F. for 1 hour on September 10. They were potted on September 11, and commenced to flower on October 16.

Korean Chrysanthemum seedling, from Miss L. M. Barnett, Upminster, Essex.

Korean Chrysanthemum seedlings, from C. E. Bridgett, Esq., Hampton Wick, Surrey.

EXTRACTS FROM THE PROCEEDINGS
OF THE
ROYAL HORTICULTURAL SOCIETY

GENERAL MEETINGS

NOVEMBER 5, 1946.

FLORAL COMMITTEE B.—Lord Aberconway, C.B.E , V.M.H., in the Chair, and fourteen other members present.

Awards Recommended :

Silver Banksian Medal.

To Messrs Burkwood & Skipwith, Ltd., Kingston, for an exhibit of berried and ornamental-leaved shrubs

To Elstead Nurseries, Godalming, for an exhibit of berried shrubs and rock garden plants.

Flora Medal.

To Mr Stephen Sims, Draycott, for an exhibit of Conifers.

To Mr F Street, Woking, for an exhibit of Conifers

To Mr G G Whitelegg, Chislehurst, for an exhibit of Conifers.

Banksian Medal

To Mr J Klinkert, Richmond, for an exhibit of clipped Box trees.

First-class Certificate

To *Arbutus Menziesii fructu coccineo*, as a hardy, ornamental-fruiting tree (votes unanimous), from Charles Eley, Esq., East Bergholt Place, Suffolk. See p 39

Other Exhibits.

Berberis Prattii, Malus baccata var *mandschurica*, exhibited by Mrs. Holden, Goldwell, Newbury.

ORCHID COMMITTEE.—Mr. Gurney Wilson, F.L S., V.M H., in the Chair, and ten other members present.

Awards Recommended :

Award of Merit

To *Odontioda* × ' Eudacis ' (*Odontioda* ' Acis ' × *Odontoglossum* ' Eudora '), (votes 6 for, 2 against), from H S. Wharton, Esq., Shalston, Templewood Avenue, Hampstead. (See p. 122)

To *Potinara* × ' Medea ' (*Sophrolaeliocattleya* ' Cleopatra ' × *Brassolaeliocattleya* ' Beatrice '), (votes 8 for, 0 against), from Messrs. H. G. Alexander, Ltd., Tetbury, Glos (See p. 123)

JOINT PERPETUAL FLOWERING CARNATION COMMITTEE.—Mr. G. Monro C.B E , V M H., in the Chair, and eight other members present

Awards Recommended :

Award of Merit

To ' Marian Allwood,' as an exhibition variety (votes 7 for, 0 against) and ' Royal Crimson,' as an exhibition variety (votes 6 for, 0 against) both shown by Messrs. Allwood Bros., Ltd., Wivelsfield Nurseries, Haywards Heath, Sussex. (See p. 41)

Other Exhibits.

' Market Pink ' (to be seen again), shown by Messrs Allwood Bros., Ltd., Haywards Heath, Sussex.

' Cheshunt Salmon ' and ' Cheshunt Pink,' both shown by the F.J.D. Nurseries, Ltd., Burton Lane, Goff's Oak, Waltham Cross, Herts.

' Foam,' shown by Mr. Fred Lovering, Hazel Cottage, Goff's Oak, Waltham Cross, Herts.

' Snowdrift ' (to be seen again), ' Winston Churchill ' and ' Gracie Fields,' shown by Messrs. Stuart Low Co., Bush Hill Park, Enfield, Middlx.

DECEMBER 3, 1946.

SCIENTIFIC COMMITTEE.—Mr. E. A. Bowles, M.A., F.L.S., F.R.E.S., V.H.M., in the Chair, and seven other members present.

Parasite of American Blight.—Mr. G. F. Wilson showed American Blight parasitized by *Aphelinus mali* which has now been established at Wisley. Attempts made to establish it some years since had repeatedly failed but three years ago another race of the parasite had been introduced which had passed safely through the intervening winters and had increased considerably.

Branching of Cyclamen persicum.—Mr D E. Green showed a plant of *Cyclamen persicum* which had produced branches bearing leaves and flowers from the corm. These branches were about the same thickness as the petioles and 2 inches or more long, carrying in some instances several flower buds

Autumn-flowering of Cornus Nuttallii.—Lady Byng wrote regarding the specimen of *Cornus Nuttallii* shown in July (R.H.S. JOURNAL, 71, p lxv) that she had seen trees of this species in the Malahat Pass, nr Victoria, B C., flowering both in spring and autumn This is not usual but occurs in certain trees there.

FRUIT AND VEGETABLE COMMITTEE.—Mr F. A. SECRETT, F.L.S., V.M.H., in the Chair, and twenty-one other members present.

Awards Recommended:

Gold Medal

To The Governors, St. Andrew's Hospital, Northampton, for a collection of Potatoes.

Silver Knightian Medal.

To The Army Education and Welfare Scheme, War Office (A.E.4), 45, Eaton Square, London, S.W. 1, for a Group of Vegetables.

Other Exhibits.

Collection of Celery, Celeriac, and Onions from Messrs. Watkins & Simpson, Ltd., 27, Drury Lane, London, W C 2.

Unnamed Apple, from G. C Kermode, Esq , Surby House, Port Erin, Isle of Man

Apple, 'Belle de Boskoop,' sent as 'Golden Reinette,' by John Shipp, Esq , The Poplars Farm, Cambridge, nr. Gloucester

FLORAL COMMITTEE A.—Mr. G W. LEAK, V.M.H., in the Chair, and twelve other members present.

Awards Recommended:

Silver-gilt Flora Medal.

To Messrs Blackmore & Langdon, Bath, for an exhibit of Cyclamens.

To Messrs A. G Vinten, Ltd., Balcombe, for an exhibit of Chrysanthemums.

Silver-gilt Banksian Medal.

To Messrs Allwood Bros , Haywards Heath, for an exhibit of Carnations.

To Capt. W. H Lampard, Cowbridge, Glam , for an exhibit of 'Regal Favourite' Chrysanthemums.

Silver Lindley Medal

To Messrs C Engelmann, Ltd., Saffron Walden, for an exhibit of Anemone flowered and pompon Chrysanthemums.

Silver Flora Medal

To Messrs. Greenyer Bros., Ltd , Worthing, for an exhibit of Chrysanthemums.

To Messrs. Keith Luxford & Co., Sawbridgeworth, for an exhibit of Chrysanthemums.

Flora Medal.

To Messrs Biddlecombe Bros , Bracknell, for an exhibit of Carnations.

To Mr Stuart Ogg, Swanley, for an exhibit of Chrysanthemums.

Banksian Medal

To Messrs Knights (Hillingdon Heath), Ltd., Hillingdon Heath, for an exhibit of cascade Chrysanthemums.

FLORAL COMMITTEE B.—Lord ABERCONWAY, C.B E., V.M.H., in the Chair, and twenty other members present.

Awards Recommended:

Silver Banksian Medal.

To Messrs. L. R. Russell, Ltd., Windlesham, for an exhibit of Begonias, Abutilons and other greenhouse plants.

Flora Medal.

To Mr J. Klinkert, Richmond, for an exhibit of clipped Box trees.

Banksian Medal.

To Mr F. Street, Woking, for an exhibit of Hardy Heaths and Conifers.

Award of Merit.

To *Daphne Bholua* as a hardy, flowering shrub (votes unanimous, subject to verification of name), from Mrs. M. W. Stoker, The Summit, Loughton.

Other Exhibit.

Cotoneaster sp. (McL. 1938), exhibited by Lord Aberconway, C.B.E., V.M.H., Bodnant.

ORCHID COMMITTEE—Mr. GURNEY WILSON, F.L.S., V.M.H., in the Chair, and eleven other members present.

Awards Recommended :

Silver-gilt Banksian Medal.

To Messrs Sanders, St. Albans, for a group of Orchids.

Silver Flora Medal.

To Messrs. Stuart Low & Co., Jarvis Brook, for a group of Orchids.

First-class Certificate.

To *Brassolaeliocattleya* × 'Crusader,' var. 'Radiant' (*Blc.* 'Queen Elizabeth' × *Lc.* 'Trivanhoe') (votes 9 for, 0 against), from H. W. B. Schroder, Esq., Dell Park, Englefield Green, Surrey (See p. 120)

To *Laeliocattleya* × 'Michael,' Westonbirt var. (*C. labiata* var. *Gilmouriae* × *Lc. Schroederae alba*) (votes 10 for, 0 against), from Messrs H. G. Alexander, Ltd., Tetbury, Glos (See p. 122.)

Award of Merit

To *Cypripedium* × 'Bahram,' Orchidhurst var. ('Grace Darling' × 'Anita') (votes 10 for, 0 against), from Messrs. Armstrong & Brown, Tunbridge Wells. (See. p. 120.)

To *Cypripedium* × 'Banchory' ('Grace Darling' × 'Dickler') (votes 9 for, 0 against), from Mr S. Farnes, East Grinstead (See p. 121).

To *Angraecum infundibulare*, St Albans var. (votes 9 for, 0 against), from Messrs Sanders, St Albans (See p. 120.)

Other Exhibits Included :

Cypripedium 'Bladon,' var. 'Peacock,' from L. W. Brummitt, Esq., Banbury
Cypripedium 'Nofrure,' from Messrs. H. G. Alexander, Tetbury.
Cypripedium 'Brailes,' var. 'Rusper,' from Messrs. Stuart Low & Co.

AWARDS TO SUNDRIES, JULY–OCTOBER, 1946

(Awards to Sundries are valid for ten years only)

Award of Merit.

Wizard Self Travelling Sprinkler, from British Overhead Irrigation Ltd.
Tomato Cloches, from Chase Protected Cultivation, Ltd.
Barn Cloches, from Chase Protected Cultivation, Ltd.
Tent Cloches, from Chase Protected Cultivation, Ltd
Lantern Cloches, from Chase Protected Cultivation, Ltd

Highly Commended.

"The Rakadrill," from Mr. H. J. R. Skaif.
"The Plantool," from Plantools, Ltd.

Other Items Inspected.

The Universal Planting Tool, from M. Stuart & Co.

DONATIONS TO THE SOCIETY'S GARDENS AT WISLEY, 1946

ABERCONWAY, Lord, Bodnant ; seeds, and plant of *Photinia glomerata* ADES, Mrs., Oxshott ; plants. ALLEN, W. R., Bookham ; *Lilium Martagon* var. *Cattaniae*. AMSLER, Dr M., Hawkhurst ; seeds, and plant of *Camellia japonica* × 'Jupiter.' ANDREWS, R. E., Bexley Heath, scions. ANLEY, Mrs G., Woking ; corms. ANSELL, Lt.-Col. Bideford ; seeds ARNOLD-FORSTER, W., St Ives, cuttings. BAGGESENS NURSERIES, Kent ; seeds BAKER, E. G., Kew ; books. BAKER, G. P. Sevenoaks ; seeds. BAKERS, Codsall ; Apple 'Red Bell.' BALFOUR, A. P., Reading ; seeds. BARTHOLOMEW, Miss, Reading ; bulbs. BARR & Sons, Covent Garden ; bulbs. BASEL BOTANIC GARDENS ; seeds. BRECHER, A., Australia ; bulbs BENTLEY, W. Newbury ; cutting, seeds, and bulbs. BERKELEY, Mrs. ; seeds. BISHOP, G. O., Worcester ; canes BISHOP, W. V., Harrogate ; plants. BOLITHO, Col., Penzance ; seeds. BOOTHMAN, H. S., Maidenhead ; plants. BOWLES, E. A., Enfield ; seeds, corms, and scions. BROWN, J. J., Westcliffe-on-Sea ; seedlings, and seeds. BUTLER, Mrs., Pulborough ; seeds. CALCUTTA, ROYAL BOTANIC GARDENS ; seeds. CAMPBELL, A., Harrogate ; *Juniperus procumbens*. CAMPBELL, D., London ; plants. CHEAL, Messrs. ; grafting wood. CHAMPEX BOTANIC GARDENS ; seeds. CHICK,

H. G., Bridport; buds. CHRISTCHURCH BOTANIC GARDEN, N.Z.; seeds. CLARKE, W. B., & Co., California; plants. CLIBRANS, Messrs., Altrincham; plants. CLIFT, L. F., Worcester; scions. CLIVE, Col. H., Shropshire; seeds. COCHRANE, A., Fife; plants. CONEY, F, Farnborough; grafting wood. COOK, F., Colchester; seeds. COOKE, R. B., Corbridge; seeds and plants. COPELAND, T., Wokingham; seeds. COPENHAGEN UNIVERSITY BOTANIC GARDENS; seeds and bulbs. CORREVON, A., Geneva; plants COUTTS, J., Woking; seeds. CURWEN, Rev. R B., Tunbridge Wells; seeds. DALRYMPLE, G H., Southampton; plants and seeds. DAVENPORT-JONES, Miss H., Hawkhurst; cuttings. DAVEY, H. G., Salisbury; cuttings. DAVIS, P., Edinburgh; seeds. DONARD NURSERY CO., co. Down; shrubs. DOWNER, J., Tenbury Wells; grafting wood. DRAKE, J, Inverness-shire; plants. DUFF, Lady, Blackhill; plants. DUNLOP MCCRAITH, Mrs. G E., North Peterton; seeds DYKES, F. W., Lymington; plants. EAST MALLING RESEARCH STATION; grafting wood and plants. EASTHOP, C. H., London; seeds. EDINBURGH, ROYAL BOTANIC GARDEN; seeds, plants and cuttings. ELCOCK, R, Horsham; seeds. ELEY, C., Suffolk; seeds. ELLIOTT, C., Stevenage; seeds and plants FAIRWEATHER, N. B., Sandbank; seeds. FAWKES, Miss M. C., Oxford; seeds. FIELD A. W. J., Wembley; seeds. FINZI, G., Newbury, grafting wood FISK, A., Burton-on-Trent; seeds. FREEM, G. F., Nailsworth; plants. FRONDE, Mrs. ASHLEY, Kingsbridge; seeds GARDNER, Mrs. G., Sussex; seeds GARDNER, R., Dorchester; buds. GAULD, J, Merrow; seeds. GERMAN, Mrs., Worthing; seeds. GIBSON SMITH, Mrs., North Wales; seeds GIUSEPPI, Dr, Felixstowe; plants, cuttings and seeds. GLANFIELD, F. G., Hornchurch; plants and seeds. GODMAN, Dame ALICE, Horsham; cuttings. GOODWAY, N, Coventry; grafting wood. GORE, R., Virginia Water; corms. GORVANS, H H, Alnwick; bulbs GOTHENBURG BOTANIC GARDEN, Sweden; seeds GRAY, A, Camborne; *Narcissus* × 'Peaseblossom' GRAY, J., Saxmundham; seeds. GREATOREX, H. A., Hawkhurst; seeds GREENWOOD, Mrs, Harrogate; *Meconopsis betonicifolia*. GRUBB, C. W. & Son, plants. GUNNER, D H., Australia; seeds HACK, Mrs. C. E., Betchworth; seeds. HADDON, N. G., West Porlock; plants, bulbs, and seeds. HALL, Mrs., W. K. Lymington; plants. HALL, Mrs ZOE, Dublin; seeds. HARE, M., Devon; seeds. HARRISON, Mrs. R. A., Hawkhurst; seeds. HASTINGS-ORD, Mrs., Hindhead; seeds. HAWKINS, LEWIS, Charing, plants. HENDERSON, Mrs. M. L. S., Argentine; plants. HEPBURN, W. J., Hampton Court; cuttings. HIGGINS, Mrs., V., Croydon; *Hechtia glomerata*. HILLINGS & Co., Chobham; plants. HITCHEN, C. S., Kirkuk; seeds HOLLIDAY, Miss O. M., Leeds; grafting wood. HORLICK, Col., Sunninghill; plants HURST, W. L., U.S.A.; seedlings. HUTCHINSON, W., Finchampstead; seeds. IONIDES, Mrs., Ripley; cuttings. INGRAM, COLINGWOOD, Cranbrook; plants and seeds. JACKMAN, Messrs. Woking; plants, cuttings and herbs. JACKSON, A, Bromley Common; grafting wood. JENKING, Dr., Hindhead; plants and cuttings. Jones, C H., Borden; plants. JONES, G H., Leighton Buzzard; plants JOHNSTONE, Major, Campden; bulbs and seeds. KAYE, R., Silverdale; plants KAYE, W.; seeds. KEW, ROYAL BOTANIC GARDENS; plants, cuttings and seeds KIMBERLEY, MCGREGOR; seeds. KIRK, Lt-Col J. W. E., Gedling; seeds KNIGHT, A. T, West Clandon; seeds. KNOWLES, H, Birmingham; seeds. LAURENCE, Mrs. N., Peterborough; grafting wood. LAWRENSON, T. A., Newcastle-on-Tyne; plants. LAXTON Bros, Bedford; plants LENINGRAD BOTANIC GARDENS; seeds. LILLEY, A. C., Leighton Buzzard; zinc labels. LIMERICK, Lord, Chiddingly; seeds. LINDLEY, E. A., Epsom; grafting wood. LINDLEY, Lady, Alresford; bulbs. LINDSAY, Miss N., Sutton Courtenay; plants and cuttings. LLOYD, F. G., Reading; seeds. LLOYD, Mrs. M., Cardigan; cutting of Frangipani. LOCKWOOD, Mrs., Leeds; seeds. LONG, F. R., Johannesburg; seeds LUDLOW, W. C., London; seeds. LUKIN, Mrs., Burghfield Common; Phyteuma. MACK, F. C., Streatham; copy of *The Ladies' Flower Garden of Ornamental Bulbous Plants*. MACKAY, E. A., Trowbridge; grafting wood. MACPHAIL, T., Dorchester; Cheiranthus 'Gold Rose.' MAITLAND, Mrs. A. CRICHTON, Bourne; grafting wood. MARGWICK, L., California; tubers. MASK, J., Florida; bulbs. MASSEY & Sons, Spalding; bulbs. MATHEWS, A. J., London; plants and seeds. MATTHEWS, A. M., Coachford; seeds. MATTON, M., Sweden; plants and seeds. MAXWELL, Lady; bulbs. MEASHAM, R. J. R., N. Berwick; seeds. MICHIE, Messrs. ALNWICK; bulbs. MIDGLEY, T. N., Penticton; seeds. MILES, J. P., Coulsdon; plants and seeds. MILES, J. T., Lamberhurst; grafting wood. MOLESWORTH, Mrs., Crawley Down; seeds. MOONEY, Capt. G. K., Sevenoaks; cuttings. MORDAN, P. C., Reigate; *Boltonia asteroides*. MORTON, Miss, Heathfield; seeds.

(*To be continued*)

PATRONS, COUNCIL AND OFFICERS, 1947.

PATRONS

THEIR MOST GRACIOUS MAJESTIES THE KING AND QUEEN
HER MOST GRACIOUS MAJESTY QUEEN MARY
H.R.H. THE PRINCESS ROYAL

PRESIDENT

LORD ABERCONWAY, C.B.E., V.M.H.

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The Viscount Ullswater, G.C.B., P.C.
Professor L. H. Bailey, LL.D., Litt.D.
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Alister Clark.
F. Cleveland Morgan.
Sir Frederick Moore, M.A., D.Sc., F.L.S., V.M.H.
B. Y. Morrison.
C. T. Musgrave, V.M.H.
C. G. A. Nix, V.M.H.
Colonel The Hon. Sir Heaton Rhodes, K.C.V.O., K.B.E.
Sir William Wright Smith, M.A., F.R.S., F.R.S.E., F.L.S., V.M.H.

TREASURER: R. D. Trotter.

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The Duke of Devonshire, K.G.
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T. Hay, C.V.O., V.M.H.
G. W. Leak, V.M.H.
G. Monro, C.B.E., V.M.H.
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Sir William Wright Smith, M.A., F.R.S., F.R.S.E., F.L.S., V.M.H.

EDITOR OF "CURTIS'S BOTANICAL MAGAZINE"

A. D. Cotton, O.B.E., F.L.S., V.M.H.

EDITOR OF "R.H.S. DICTIONARY OF GARDENING"

F. J. Chittenden, F.L.S., V.M.H.

EDITOR

P. M. Synge, M.A., F.L.S.

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DIRECTOR OF WISLEY GARDENS

J. S. L. Gilmour, M.A., F.L.S.

SECRETARY

Brigadier C. V. L. Lycett, O.B.E., B.A.

DEPUTY SECRETARY

A. Simmonds.

AUDITOR: F. G. Feather, F.C.A. (Messrs. Harper, Feather & Paterson, Chartered Accountants).

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EXTRACTS FROM THE PROCEEDINGS
OF THE
ROYAL HORTICULTURAL SOCIETY

ANNUAL GENERAL MEETING.

FEBRUARY 18, 1947

REPORT OF PROCEEDINGS of the ONE HUNDRED AND FORTY-THIRD ANNUAL GENERAL MEETING, held in The New Hall, Greycoat Street, Westminster, S.W. 1, on Tuesday, February 18, 1947.

The Lord ABERCONWAY, C.B.E., V.M.H., President, in the Chair, with Members of Council and over two hundred and fifty Fellows.

The PRESIDENT: Ladies and Gentlemen, it is now three o'clock, and I will call upon the Secretary to read the Notice of the convening of the Meeting.

The SECRETARY read the Notice convening the Meeting, and said: The Minutes of the last Meeting were circulated in the JOURNAL of the Society, No. **71**, Part 4 of the April 1946 edition.

The PRESIDENT: I move

> THAT under those circumstances the Minutes be taken as read and that I be authorised to sign them as a correct record. Is that agreed?

(The Meeting agreed and the Minutes were then signed by the Chairman.)

The PRESIDENT: Ladies and Gentlemen, Fellows of the Society, I rise to move

> THAT the Report of the Council be adopted.

On the last occasion when I addressed you about a year ago I said, perhaps in somewhat extravagant language, that we were experiencing the golden dawn of a new era. Some poet has spoken of "the chill before the dawn"; I think we are experiencing that chill to-day, and that the sun of this new era, as far as the country generally is concerned, is not rising so quickly or so warmly as we could desire. But when I used those words last year I was rather referring to the Society itself, and the Society itself is regaining its balance more quickly than the country generally.

We had perforce to ration Fellows of many of their privileges during the war: there were very few Shows; Wisley was inaccessible and to some extent neglected; the Library, at any rate most of the books, was moved to Aberystwyth. But now these privileges have been I am glad to say very largely restored.

There is another remarkable thing, and that is the great and increasing interest that is being displayed in horticulture, especially as witnessed by the Society. Our Fellowship, including Associates and other Societies, is now 27,780, a very substantial figure, and very much larger than it was when we raised the subscription. The attendances at the Flower Shows have been extremely good, so good that we have thought it time slightly to raise the pre-war prices for admittance to our Shows from others than Fellows of the Society. I think perhaps that some of those who come to our Shows who are not Fellows will think that it is pleasanter to be a Fellow even at Two Guineas.

The Shows for this year will be almost normal in number and duration; they will all be two-day Shows again. The luncheon facilities will be re-established, and those of you who do not know what queues are like, will be able to queue for lunch.

The Chelsea Show—I always deem this to be one of the best privileges of the Society—will I am glad to think, start again, but we must remember this: our Trade exhibitors have been very much handicapped by war-time restrictions, the amount of glass they can use for ornamental plants has been very small, they have had great difficulties with fuel and labour, and their stocks of plants are naturally extremely low. I can envisage myself saying to some one with a stand, "I should like a dozen of those excellent plants; can you send them this week so that I can get them planted soon?" His reply would probably be, "Well, Sir, I think as it is you, I could spare you one small plant in the Autumn of 1950." Perhaps it will not be quite as bad as that, but plants will be naturally short, and I think we must recognize it to be a very far-sighted and courageous act on the part of our exhibitors, when they are so short of stocks for sale, to come and exhibit at our Shows, especially a Show like Chelsea to which a good deal of expense is attached.

Then there is Wisley. Our friend, Mr. HARROW, to whom Wisley owes so much, has now to our great regret, retired; so has Dr. TINKER who was a great help to us in scientific matters. We have appointed in Mr. HARROW'S place as Director, Mr. GILMOUR, who before the war was at Kew, and who in that position acquired enough of the Civil Servant touch to be a very skilled administrator, because there are no more skilled administrators in the world than our Civil Servants—if there is not too much of it—and he is besides a writer, a botanist and a gardener.

With the assistance of Mr. HANGER, our new Curator, he is undertaking great improvements in the Wisley Garden. We are catching up the arrears that war has left, and above all, we are reorganizing the ground which we call Battleston Hill, a new piece of garden at the beginning of the war, which has not had the attention given to the older portion. On Battleston Hill we are pulling out—it is generally done by bull-dozers these days—the smaller and poorer trees and a certain number of dead trees, in order to leave the splendid Pines so that they can be seen.

We are also reorganizing the planting of the Rhododendrons; we have a very fine set there, but our collections are not complete, and we are taking steps to thin the plants and to complete the collection. Our Rhododendrons are not being hurt by being moved, they are being classified, hybrids in one section and species in another, and we are making a great planting of the rarer Azaleas. In completing our collections we have been greatly helped by most liberal donations of plants, notably from Mr. STEVENSON, Capt. EDMUND DE ROTHSCHILD and Mr. RUSSELL of the Sunningdale Nursery, and we shall have a very fine collection when our plantings are complete.

We have been very much helped in what we have done at Wisley from the fact that in connection with the Government scheme for the training of ex-Service men we are undertaking the training of no less than 39 of them. They have had some experience of gardening before they went into the Forces, and they want the finishing touches in a good garden like Wisley to make them very expert gardeners. They get a certain amount of scientific training from our Scientific Staff, and they are very rapidly, if I may put it so, changing their swords into ploughshares.

There is another activity in which we are engaged at Wisley which is interesting, that is the study of chromosomes, and the improvement of plants by attempting to double the chromosomes which are in each cell of a plant. I do not know whether all of you have followed the work done on this subject at the John Innes Institute and also elsewhere, but we have secured the assistance of Dr. JANAKI AMMAL, an Indian lady who has studied this matter for many years, and who with Dr. DARLINGTON, a great authority on the subject of chromosomes, recently published a book on the matter.

What we are trying to do is nearly to kill seedlings with chemicals in the hope that the shock may induce them to become in their chromosomes tetraploid instead of diploid. It is as if you took a criminal and hanged him in the old-fashioned way. If you went on a little too long he was hanged and done for and of no use ; if you stopped too soon, it would also be of little use as he would survive unchanged, but if you could stop at just the right place where he was very nearly hanged, you might get him out a reformed man. That is what you do with these chromosomes. We must recollect that nearly all the cereals we eat, the wheat, and the barley and oats that are fed on by cattle and horses will differ from the wild plants of their type by being tetraploid, the double chromosomes being made into four. Colonel STERN tells us that in the new races of Iris which are coming out, especially in the United States, where they are very keen on hybridizing Iris, the best ones tend again to be tetraploid and not diploid as the old original Iris were. There is therefore some prospect—it is only a prospect, perhaps a gamble—of producing better plants from our old stock. It is an interesting experiment and we hope to report to you from time to time what success we have.

There is just one more thing about Wisley, and that is this : even the smallest of motor-cars will carry four passengers. The Fellow's ticket admits only three people, and we thought it right that the Fellow's ticket should in future admit four people.

Then there is the question of our publications. Our JOURNAL, you will observe, is breaking into colour, and we hope to have certain coloured plates in future in the JOURNAL, and we also hope that these coloured plates will gradually improve as time goes on. I am afraid the March JOURNAL will be very late owing to this cut in electricity, and the uncertainty as to whether the Government will allow a monthly publication to come out at all, even if it is published when there is coal about again. It is an extraordinary thing, but there is a doubt about it.

Then the *Dictionary of Gardening* is getting on well, some has been already set in type by the Oxford Press. As we see the proofs, we are increasingly convinced that we are very fortunate indeed to have our friend, Mr. CHITTENDEN, as Editor. I have seen many notable gardeners, but I think Mr. CHITTENDEN knows more about garden plants than anyone I have ever met. His only rival is my friend, Mr. BOWLES.

Mr. BOWLES is also doing good work for us because he is adding to what he has always been doing by writing a monograph on Anemones. He and Col. STERN also, I believe, have in mind a monograph on Snowdrops of which there are many good species we do not ordinarily grow.

We are publishing the Year Books as usual. The Rhododendrons will not only have a Year Book, but later in the year we shall republish the handbook which gives collectors lists of species and information of that kind ; it does not change very rapidly, but we propose to review it every five years. We shall publish a new part of the Handbook every five years, but an edition of the Year Book every year.

Then the Paeony Book is now out, doubtless you will have seen it. We are very grateful to Col. STERN for presenting us with such a wonderful publication ; he has presented us with all the manuscripts and the plates, while two legacies, as you will see in the Introduction to the Book, have been used to defray the costs of publication. We hope if sales are adequate that the legacies will not be required, in which case they will be passed on to some other publication.

Meanwhile, Mr. GARSETT PRICE, who died recently, has left us a further legacy of £500, which has been placed in reserve at the moment, but which may be used in future for some further publication.

There is another publication which we are preparing. You know our *Vegetable Garden Displayed* which we issued during the war and of which we sold hundreds of thousands of copies, the photographs showed exactly how to dig a garden and cultivate plants. Now we are going on and preparing a *Fruit Garden Displayed*, also showing the work of pruning and planting, and we feel this will be a great help to Fellows and others in planting their fruit.

There is one other matter in regard to our publications, that is the *Botanical Magazine*. The *Botanical Magazine* is an illustrated periodical which started in 1787, 160 years ago. Some thirty or forty years ago the copyright was presented to the Royal Horticultural Society, and we have carried it on since then. It has a very great reputation, not only because of its age, but also because of the profound botanical learning which is found in its pages, but it has a very small circulation. There was an old apple woman—I think she sat outside Kensington Gardens—who said she lost just a little on every apple she sold, but that as she sold so many she was able to make a good living out of it. Unfortunately that is not the case with the *Botanical Magazine*, and for this reason: the plates are hand-coloured, and the cost of hand-colouring each volume is more than we get for the volume, so that the financial position of the *Botanical Magazine* at present is not improved if we increase the circulation; it is rather the opposite. We feel we have two alternatives, one to drop the *Magazine* which would be a great pity; and the other is to have the plates colour printed. There are some wonderful processes to-day for colour printing. We should select one of the best, and next year, in 1948, we would issue it as a colour printed magazine. We should try and get rather more horticultural interest in it, selecting plants which have more horticultural value, and perhaps not figuring plants which are merely of botanical value. Then we should be able to increase the circulation by advertisement and by pushing it, and, of course, if we had an increased circulation every additional copy would be printed for only a very small fraction of the original cost of preparing the plates. I think we may be able to make a success of the *Magazine* on those lines.

I always have to lament the retirement from the Council of certain of our friends. You know that members of the Council serve for five years, then they go off the Council under our Charter and are not eligible as a rule for re-election that year. We are losing this year Mr. CHEAL and Mr. OLDHAM, both members of Council whose profound knowledge of plants and whose very sound advice have been of very great service to us; we hope their retirement from the Council will only be a temporary one.

Our Treasurer, Mr. TROTTER, also retires, but we have used the privilege which we have in the Charter of suggesting to the Fellows that one retiring member of Council shall be eligible for immediate re-election, and as will be reported to you later, Mr. TROTTER has been re-elected to our Council. Not only is he a most admirable and hard-working Treasurer, but he has one good quality which I think is most useful to a Treasurer, namely that at the end of the year he always finds that the balance of surplus income is much larger than he had led us to expect.

Of the members who will replace the two who are leaving us, there is Col. STERN, full of enthusiasm and good suggestions, and always keen on making things better. If he had a yellow Daffodil, he would breed another in the hope of getting it pink. There was a rumour the other day of his breeding a new Iris which combined the colours of infra-red and atomic blue, whatever that may be. With Mr. TROTTER always having a bigger balance than he expected, and Col. STERN always wanting to spend more money than we have got, we shall have a most excellently balanced team.

Then there is our old friend, Mr. MONRO, who is I am glad to say rejoining us. He I think regards the Council with the same affection that they regard him. He is an outstanding figure in that great industry of Covent Garden—I always like to think of him as The Duke of Covent Garden—but that sounds rather like Grand Opera, and I know that he is rather more interested in the vegetable end than in the musical end of Covent Garden. We shall rejoice to have him back with us again.

Then I should like to give our most cordial thanks to our Secretary, Brigadier LYCETT, to our Deputy-Secretary, our old friend, Mr. SIMMONDS, and to their excellent and devoted staff for all the good work that they have done for us during the year. But that good work would have been very much more difficult but for the voluntary assistance they have received from the Fellows of the Society, and especially from those who are skilled in the various branches of our work. We go to busy men and ask them to help us and we never ask in vain. It is that spirit of cordial co-operation which makes the Society really great.

I will now call upon the Treasurer to second the Motion I have moved, and to make a financial statement.

Mr. R. D. TROTTER. When we met a year ago I was able to report that the response of our Fellows to the increase in subscriptions in September, 1945, had been very gratifying, but it resulted in the resignation of 5,000 Fellows, which we much regret. However, during 1946 over 5,000 new Fellows have been elected, and by the end of the year our membership totalled 27,350. At the present date our membership is 150 more than at September 1945, but is still considerably below the 1939 figure of 36,500.

For 1945 our subscription revenue was £38,000, whereas for 1946 it has increased to £62,000, an addition of £24,000. At the same time our income from letting the two Halls and interest has increased by £9,000, while our expenses also have considerably increased.

After making the usual appropriation to the Halls' Sinking Fund, the net result for the year shows a surplus of £20,000, against a deficit of £2,500 a year ago. We have added £11,000 of this surplus to General Reserve, and set aside £9,000 for Deferred Repairs, namely, £6,000 in London and £3,000 at Wisley, all of which I fear will be required and much more besides when we are able to get the work done. We have held more Shows in our Halls, which accounts for the increased expenditure on meetings, against which receipts have also risen considerably.

Having the glass roof repaired on both Halls has produced the large increase in Hall letting revenue to which I have referred, but that is not the end of the story, for we foresee very considerably increased expense ahead before they are put into proper order and redecorated.

In the Balance Sheet you will see our General Reserve is now over £43,000 as against the 1939 figure of £50,000.

The Supplementary Pension Fund and its investments have disappeared this year, having been transferred to the Beneficiary, our late Secretary, Colonel DURHAM.

The market value of all our invested funds you will see is in excess of the figure which is shown in the Balance Sheet.

I told you last year that we must expect a considerable increase in the cost of Wisley. The Accounts show an increase of £4,000 in establishment expenses, mostly for salaries and wages, and £2,500 on garden expenses, which includes Fruit Trials, but sales of fruit and produce increased by £3,000. In 1947 the Ministry of Agriculture will share the net expenditure on the Fruit Trials with us.

We are in process of installing new boilers, and have in view considerable outlay to put the glasshouses in order, towards which, as I have told you, we have allocated £3,000. Including this sum, the net expenditure on Wisley amounted to £21,000.

I have much pleasure in seconding the Report.

The CHAIRMAN : Would any Fellow like to put a question on any part of the Report ?

It has been moved and seconded that the Report of the Council be approved. If there are no questions, I will put that to the meeting.

(Motion put and carried unanimously.)

Mr. E. A. BOWLES : Mr. Chairman, Ladies and Gentlemen. It is customary that I rise at this point in the proceedings to present you with a piece of good news, and I expect you really do know what it is, and will agree with me that it is good news that, in response to the unanimous request of the members of the Council, Lord ABERCONWAY allowed his name to go forward for re-election as our President. As no other name has been put forward, under By-law No. 59, I have the privilege and pleasure to declare to you that Lord ABERCONWAY has been duly elected our President for the current year.

The PRESIDENT : Ladies and Gentlemen. I need hardly say how much I appreciate your action in re-electing me President of this great Society. It is not only a most distinguished honour, but it is also a very sincere pleasure to me to be your President. I am especially glad to be re-elected on this occasion, because an invitation has come from the Horticultural Society of New York to the Council asking whether they would send some one to represent them at the great New York Show in March. The Council were good enough to suggest to me that I should go over. As I had business in the States it was very convenient to me, and I am going to represent you there ; I feel I shall represent you more adequately if I am your President.

They have asked me various questions as to my suitability—not the New York Society, but the United States Government. They have asked me whether I can read and write ; they asked me whether I had been in a prison or a mental home ; they asked me whether I would advocate polygamy ; they asked me whether I would overthrow the United States by force of arms ; and, unkindest cut of all, they asked me whether I had the money to pay my passage back. Having, I hope, adequately solved those knotty points, I am assured by your many friends in New York and Boston and Philadelphia where I am attending Shows, that I shall receive the very warmest of welcomes. I hope that I may say with your unanimous concurrence that I take from you to them your very best wishes and your kindest and most affectionate regard.

I now beg to announce to you the election of the following as Vice-Presidents. You will remember we extended our List of Vice-Presidents so as to include the various countries of the Empire and the United States. They are :

General H.H. Maharaja Sir Joodha Shumshere Jung Bahadur Rana of Nepal.
Lieut.-General H.H. The Maharaja of Jammu and Kashmir.
Field Marshal the Rt. Hon. Jan C. Smuts.
The Viscount Ullswater.
Professor L. H. Bailey.
Mr. E. A. Bowles.
Mr. Alister Clark.
Mr. F. Cleveland Morgan.
Sir Frederick Moore.
Mr. B. Y. Morrison.
Mr. C. T. Musgrave.
Mr. C G. A. Nix.
Col. the Hon. Sir Heaton Rhodes.
Sir William Wright Smith.

I also declare the election as members of the Council of

Mr. Geo. Monro.
Colonel F. C. Stern.
Mr. R. D. Trotter.

I also declare the election as Treasurer of Mr. R. D. Trotter.

I also declare the election as Auditor of Mr. F. G. Feather of the firm of Messrs. Harper, Feather and Paterson.

I now come to the very pleasant task of making the various presentations.

The Secretary : **The Victoria Medal of Honour**—to British horticulturists resident in the United Kingdom and deserving special honour at the hands of the Society.

Mrs. Vera Higgins—a keen amateur gardener, who has made valuable contributions to horticultural literature.

The President : Mrs. Higgins is a great artist and she is doing drawings for the *Botanical Magazine* for us. She is a most skilled Editor and she was our Editor for three of the war-time years. She is a most skilled amateur gardener and first won fame in the cultivation of cactuses, and I believe that she can be cheerful when she is potting the most prickly of cactus.

The Secretary : Professor F. E. Weiss—who has been of great assistance to the Society in connection with its scientific work and its examinations.

The President : Professor Weiss is one of our most distinguished scientists and a Fellow of the Royal Society, a wonderful honour ; he held a most distinguished position in Manchester and for many years has been good enough to give us the benefit not only of his scientific advice, but of his great skill on our Examinations Board. We are delighted to present him with this medal.

The SECRETARY: Mr. BARNARD ROCHFORD—who has rendered signal service to commercial growers of glasshouse crops.

The PRESIDENT: Mr. ROCHFORD is the third member of his family to receive the V.M.H. His father and his brother also received it; he has been a very great help to the nation during the war in organizing the cultivation of vegetables as Chairman of the National Farmers' Union Glasshouse Committee. We all owe him a very great debt of gratitude. This is the only instance of three members of a family receiving the V.M.H.

The SECRETARY: **Associates of Honour**—conferred on persons of British nationality who have rendered distinguished service to horticulture in the course of their employment.

Mr. F. A. BUSH, formerly Head Gardener at Dell Park, Englefield Green.
Mr. L. J. COOK, of the Stuart Low Co.
Mr. W. G. CREASEY, of Messrs. John Rochford and Sons, Ltd.
Mr. C. J. DEW, of Messrs. George Monro Ltd.
Mr. S. M. GAULT, Head Gardener at St. Andrews Hospital, Northampton.
Mr. J. M. GRANT, Head Gardener at Grayswood Hill.
Mr. G. MILLER, Head Gardener at Bayham Abbey.
Mr. W. NELMES, M.B.E., Superintendent of Parks at Cardiff.
Mr. J. RICHARDSON, Superintendent of Parks at Manchester.
Mr. G. W. ROBINSON, Curator of the University Botanic Garden, Oxford.
Mr. ROLAND SMITH, Head Gardener at Weston Hall.
Mr. A. W. WITT, formerly at the East Malling Research Station.

The SECRETARY: **Veitch Memorial Medals**—awarded to those who have helped in the advancement and improvement of the science and practice of horticulture and for special exhibits. Gold Medal to Mr. R. L. HARROW.

The PRESIDENT: Mr. HARROW is well known as a friend to us all, a man who for 15 years has run Wisley so excellently in spite of all difficulties. But he is also known as a very great cultivator of plants. He it was who at Edinburgh used to get seeds from GEORGE FORREST and KINGDON WARD and all the other collectors in China, and if he had not cultivated them so well and got them going—they took a long time travelling from China and were not very easy to germinate—horticulture would have lost a very great many valuable plants which were not collected again. Not only that, but when he had grown them, he was able to increase them, and the authorities at Edinburgh did all they could to see that they were spread about among the various gardens in the country which could grow them well. I personally owe a very great debt of gratitude to Mr. HARROW for the seeds he has raised and the things he has sent us. He is a very distinguished gardener and very well deserves the Veitch Memorial Medal, which is one of the greatest honours this Society has the pleasure of bestowing.

The SECRETARY: Gold Medal to Mr. F. C. PUDDLE.

The PRESIDENT: This medal is given to Mr. PUDDLE for his lifetime effort in the work of hybridization. He is not only a most skilled gardener like Mr. HARROW, but he has devoted himself since he was a young man to the hybridization of plants, and especially to the hybridization of the white forms of Cypripedium. The original white Cypripediums were very hard to grow, very delicate, high temperature plants. He succeeded first of all in growing them well, and then with great persistence, great scientific knowledge and skill, he hybridized them, so that now he has got a race far finer, far larger and far easier to grow, a new race which is entirely to his credit. When he came to Wales, he added to that, enthusiasm for crossing Rhododendrons, and he has, as you know, produced hundreds of very excellent Rhododendron hybrids. It is one thing to cultivate a thing; it is perhaps a better thing to produce a new and different and better plant. That is Mr. PUDDLE's undoubted claim to the honour of the Veitch Memorial Medal.

The SECRETARY: Miss L. SNELLING.

The PRESIDENT: Unfortunately Miss SNELLING is not too well, and her sister has come to receive this grant from the Veitch Memorial Medal Fund. Miss SNELLING has helped us for very many years in drawing the illustrations and colouring them for the *Botanical Magazine*; most of those beautiful plates you have seen are from Miss SNELLING's pen and brush.

The SECRETARY: **Lawrence Medal**—for the best exhibit shown to the Society during the year. Mr. STUART OGG.

The PRESIDENT: Mr. OGG is, as you know, a great man on Dahlias. He won four gold medals during the year for Dahlias, I believe, at four consecutive Shows. Few of us have ever seen better exhibits of Dahlias than those produced by Mr. OGG; he has very well deserved the Lawrence Medal which has been awarded to him for those exhibits.

The SECRETARY: **Holford Medal**—for the best exhibit of plants and/or flowers (fruit and vegetables excluded) shown by an amateur during the year in the Society's Hall. To Lord ABERCONWAY.

Mr. BOWLES: I find there is another good deed left for this Boy Scout to-day. Lord ABERCONWAY said he did not think it was suitable for his left hand to give to his right hand this medal, so I am acting as one of his hands—I hope he will not look upon it as the sinister left—in handing him this medal which he has so wonderfully deserved in that beautiful group of Cypripediums he showed.

Lord ABERCONWAY: In thanking you, I should say what you ladies and gentlemen probably know, that they were really Mr. PUDDLE's Cypripediums.

The SECRETARY: **Sander Medal**—for the best new greenhouse plant of general utility shown to the Society during the year. Messrs. ALLWOOD BROS.

The PRESIDENT: Messrs. ALLWOOD are one of our most constant and regular exhibitors, and they have also devoted themselves to improving the plants under their care. They do not just grow them and propagate them and sell them, they try and get better plants. We all know the Allwoodii strain of Pinks, a very fine flower rightly named after Mr. ALLWOOD which will carry on his name as a plant grower for many generations. This is a medal awarded for an exceptionally fine exhibit.

The SECRETARY: **George Moore Medal**—for the best new Cypripedium shown to the Society during the year. Sir WILLIAM COOKE.

The PRESIDENT: Unfortunately we have learnt that Sir WILLIAM COOKE is ill in bed and the medal will be sent to him. It was given to him for an exceptionally fine Cypripedium shown by him before the Orchid Committee and which got a First Class Award.

The SECRETARY: **Williams' Memorial Medal**—for the best group of plants and/or cut blooms of one genus (fruit and vegetables excluded) which show excellence in cultivation, shown during the year. Messrs. BLACKMORE & LANGDON.

The PRESIDENT: There again we had a marvellous exhibit; I can picture them now, that wonderful group of Cyclamens all raised by Messrs. BLACKMORE & LANGDON. Although the medal is not given for this further fact, it should be remembered that Messrs. BLACKMORE & LANGDON again are in the foremost rank for improvements in plants. It is not only Cyclamens, but their Begonias are wonderful, also their Delphiniums; and to many other plants they have devoted their skill in improving and breeding from the plants they make so noteworthy. I have great pleasure in handing over this medal.

The SECRETARY: **Reginald Cory Memorial Cup**—offered with the view of encouraging the production of hardy hybrids of garden origin, and is awarded only to the raiser of a plant that is the result of an intentional cross. Only a hybrid of which one parent is a true species is eligible, and it must have been exhibited at one of the Society's Shows and received an award during the current year. Hybrids of annuals and biennials do not come under the scope of the Award. Mr. A. BURKWOOD.

The PRESIDENT: Mr. BURKWOOD, I have great pleasure in handing you this Cup. It was a wonderful Viburnum you exhibited, a very great advance. Although it is not the purpose of this cup, you are so well-known to us for the other hybrids you have raised in the past, notably Ceanothus 'Delight,' which I always think is a most outstanding plant in the garden. This Award is for the Viburnum which

I hope you will be able to increase in large numbers so that we shall soon see it in gardens all over the country.

The SECRETARY : Miss ROBERTS.

The PRESIDENT : Miss ROBERTS' name is familiar to us on the paintings of our Orchid Committee, and she has been a familiar figure to us for no less than fifty years. She is most skilful, and the Orchid Committee and the Society generally are very greatly indebted to you, Miss ROBERTS, for your labours, and we hand you this cheque in recognition of the fifty years' work that you have done.

CANON ROLLO MEYER : Mr. Chairman, Ladies and Gentlemen. I have been asked to propose a Vote of Thanks to our Chairman. It is a very easy task I am glad to say, because anyone who has been at these annual meetings can see with what ability, tact and humour our proceedings are conducted. I have been thinking of our Chairman a great deal lately, because when looking forward to this meeting, I thought what a good thing it would have been for all of us if only he had been Minister of Fuel and Power. I beg to propose a very hearty Vote of Thanks to him for his Chairmanship this afternoon, and for all he is doing for the Society.

Mr. CHRISTIE MILLER : Mr. Chairman, Ladies and Gentlemen. I would like to support what CANON ROLLO MEYER said about the tact of the Chairman to-day, and to say what pleasure it gives us all to be here. I think the size of this gathering is a very good indication of the feelings which all the members and Fellows of this Society have towards their Chairman. I second the Motion proposed by CANON ROLLO MEYER.

(*Motion put by* CANON ROLLO MEYER, *and carried with acclamation.*)

The PRESIDENT : CANON ROLLO MEYER, Mr. CHRISTIE MILLER, Ladies and Gentlemen. I thank you all most cordially for the way you have proposed, seconded and received this Vote of Thanks. There is no more pleasant meeting over which one can preside than over a meeting of Fellows of the Royal Horticultural Society. There is something about gardening which makes people very friendly and pleasant. I thank you all.

(*The proceedings then terminated.*)

GENERAL MEETINGS

OCTOBER 8, 1946.

FRUIT AND VEGETABLE COMMITTEE.—Mr. F. A. SECRETT, V.M.H., in the Chair, and twenty-seven other members present.

Awards Recommended :

Gold Medal.

To Messrs. Sutton & Sons, Ltd., Reading, for group of vegetables (votes 14 for, 1 against).

To the Governors of St. Andrew's Hospital, Northampton, for group of vegetables (votes 15 for, 1 against).

Silver Gilt Knightian Medal.

To Ilford Borough Council for group of vegetables.

Messrs. Toogood & Sons, Ltd., Southampton, for group of vegetables.

Silver Knightian Medal.

To Southgate Borough Council, for group of vegetables.

To Hornchurch Urban District Council for group of vegetables.

Recommended for trial at Wisley.

Tomato ' The Summit.' from Mr. F. T. S. Stagg, 18, Summit Drive, Woodford Green, Essex.

Other Exhibits.

Group of Seedling Apples and Walnuts from The Director, East Malling Research Station, Kent.

Group of Apples from the National Fruit Trials, Wisley.

Apple ' Appleby's Seedling.' from Mr. H. Appleby, Fords Green, Nutley, Uckfield, Sussex.

Apples ' Nancy King,' and ' Mary Hamilton,' from Miss M. Hamilton, Sunhoney, Milltimber, Aberdeenshire.

Apple ' Belvoir Castle ' from Mr. H. Stanton, Belvoir Castle Gardens, Grantham.

Apples ' Cyril's Pride,' ' Golden Glow,' ' Oxford Pippin,' ' Tony's Wonder,' from J F. Wastie, Eynsham, Oxford.

Seedling Apple from Mr. R. Dunston, York Cottage, Kingston, Yeovil, Som.

Seedling Apple from Mr. G. A. Kemp, Rock House, Colonels Bank, Chailey, Sussex.

Seedling Apple from Mr. H. J Redwood, 76, Parsonage Barn Lane, Ringwood, Hants.

Seedling Apple from Mr. R. F. Thoday, 18, Madingley Road, Cambridge.

Seedling Peach from Mrs. M. M Shepherd, 28, The Crescent, Earley, Reading

Seedling Potato, from Mr C. T Line, ' Seattle,' 27, Felloms Road, Cowes, Isle of Wight.

Ridge Cucumber from Mr. A. C. Nash, Scutes Farm, Elpinstone Road, Hastings.

Walnuts showing defective shells, from Mr. H. Barnett, Westwood House, Tilehurst, Berks.

JANUARY 14, 1947.

FRUIT AND VEGETABLE COMMITTEE.—Mr. F. A. SECRETT, V.H.M., in the Chair, and eighteen other members present.

Exhibits.

Apple ' Shurlock's Pippin,' from G. W. Shurlock, Esq., Birtley Green, Bramley, nr. Guildford, Surrey.

Seedling Apple, from W. V. Cassidy, Esq., 92, Dogfield Street, Cardiff.

ORCHID COMMITTEE.—Mr. GURNEY WILSON, F.L.S., V.M.H., in the Chair, and eleven other members present.

Awards Recommended :

Award of Merit.

To *Cattleya* ' Gloriette ' var. ' Rivermont ' (*Hardyano-Warneri* × ' Tityus ') (votes 9 for, 1 against), from Mr. Clint McDade, Tennessee, U.S.A.

To *Cypripedium* ' Banchory ' Dukes Edge var. (' Grace Darling ' × ' Dickler '), (votes 9 for, 0 against), from N. M. Jensen, Esq , Dukes Edge, Woldingham.

To *Cypripedium* ' Whitehall ' var. ' Pleiades ' (' Mrs. J Branch ' × ' Conference ') (votes 8 for, 3 against), from Messrs. Sanders, St. Albans.

To *Cypripedium* ' Harmachis ' var. ' Golden Radiance ' (' Gwen Hannen ' × ' Selene ') (votes 7 for, 3 against), from Messrs. H. G. Alexander, Tetbury, Glos.

Cultural Commendation.

To Mr. C. H. Rushton, Orchid grower to Sir William Cooke, Bt., Wyld Court, Hampstead-Norris, for *Cypripedium* ' Cameo.'

Other Exhibits.

Cypripedium ' Brill ' var. ' Ann Page,' from L. W. Brummitt, Esq., Banbury, Oxon.

Cypripedium ' Ravenswing,' from H. Barnard-Hankey, Esq., Piddletrenthide, Dorset.

Cypripedium ' Dianthus ' var. ' Springtide,' from Major the Hon. H. R. Broughton, Bakeham House, Englefield

Cypripedium ' Paddy Joe ' var ' Neil,' from N M. Jensen, Esq , Woldingham, Surrey.

Cypripedium Delenatii and *Laelia harpophylla*, from Frank Wyatt, Esq., Tilgate, Crawley.

Cypripedium ' Happy Landing,' from Sir William Cooke, Bt., Hampstead-Norris, Berks

FEBRUARY 18, 1947.

FRUIT AND VEGETABLE COMMITTEE.—Mr F. A SECRETT, F.L.S., V.M H., in the Chair, and sixteen other members present.

Award Recommended :

Silver-gilt Knightian Medal

To Messrs. Sutton & Sons, Ltd , Reading, for a collection of vegetables.

Other Exhibit.

Seedling Apple, from J. F. Wastie, Esq , Eynsham, Oxford.

FLORAL COMMITTEE A.—Mr G W LEAK, V M.H , in the Chair, and fifteen other members present.

Awards Recommended :

Silver Flora Medal.

To Messrs. Allwood Bros , Haywards Heath, for an exhibit of Carnations.

To Messrs. Toogood & Sons, Ltd , Southampton, for an exhibit of *Primula obconica* ' Giant Hybrids '

Selected for trial at Wisley.

Primula sinensis (Giant) ' Crimson Glow '
Primula sinensis stellata ' Crimson Star '
Primula sinensis stellata ' Enchantress '
Primula sinensis stellata (Giant) ' Meteor.'
Primula sinensis stellata (Giant) ' Salmon King '
Primula sinensis stellata (Giant) ' Salmon Queen.'
Primula sinensis stellata (Giant) ' Vanguard '

All the above mentioned Primulas were exhibited by Messrs. Sutton & Sons, Ltd., Reading.

Other Exhibit.

Roses from Messrs. Wheatcroft Bros , Ltd , Nottingham.

FLORAL COMMITTEE B.—Lord ABERCONWAY, C.B E , V M H , in the Chair, and sixteen other members present

Awards Recommended :

Silver Flora Medal.

To Messrs. Hillier & Sons, Winchester, for an exhibit of flowering and evergreen shrubs.

Silver Banksian Medal.

To Mr. K. W. Harle, Lower Basildon, for an exhibit of succulents.

To Elstead Nurseries, Godalming, for an exhibit of rock garden plants.

Flora Medal.

To Messrs. L. R. Russell, Ltd , Windlesham, for an exhibit of flowering shrubs.

Banksian Medal.

To Mr. J. Klinkert, Richmond, for an exhibit of clipped Box trees.

To Messrs. M. Prichard & Sons, Ltd., Christchurch, for an exhibit of evergreen shrubs.

To Mr. F. Street, Woking, for an exhibit of hardy Heaths and conifers.

ORCHID COMMITTEE.—Mr GURNEY WILSON, F L S., V.M H , in the Chair, and eleven other members present.

Awards Recommended :

Gold Medal.

To Messrs. Sanders, St. Albans, for a group of Orchids.

First-class Certificate.

To *Cymbidium* 'Starlight' ('Jason' × 'Letty') (votes 9 for, 0 against), from Col. the Hon. H. S. Tufton, Castle Hill, Englefield Green.

To *Cypripedium* 'Helas,' Westonbirt var. ('Desdemona' × 'Tania') (votes 8 for, 1 against), from Messrs. H. G. Alexander, Tetbury, Glos.

Award of Merit.

To *Phalaenopsis* 'Marmouset' (*Schilleriana* × 'Ninon') (votes 9 for, 0 against), from Messrs. Vacherot-Lecoufle, Boissy St. Léger, Seine et Oise, France.

To *Cattleya* 'Enid' var. 'Rivermont' (*Mossiae* × *Warscewiczii*) (votes 11 for, 0 against), from Mr. Clint McDade, Chattanooga, Tennessee, U.S.A.

Other Exhibits.

Cypripedium 'Chryscurte' ('Chrysostom' × 'Tommy Curte'), from Messrs. Harry Dixon & Sons, Wandsworth Common.

Cypripedium 'Ludovic Fraeys' ('Mulatto' × 'Mowgli'), from Messrs. Sanders, St. Albans.

Laeliocattleya 'Gaillard,' from Messrs. Vacherot-Lecoufle, Boissy St. Léger, Seine et Oise, France.

DONATIONS TO THE SOCIETY'S GARDENS AT WISLEY, 1946—*cont.*

Mulligan, B. O., Seattle; seeds, seedlings, cuttings, plants. Munn, G. G., Maidstone; plants. Murphy, Lady, Cyprus; seeds. Needham, C. L., Masterton; seeds and plants. Nevitt, J. B., Birmingham; seeds. New York Botanic Garden; seeds. Newell, Lady, Addlestone; plants. Newton, J. R., Kelham Gardens; plants. Notcutt, Messrs. R. C., Ltd., Woodbridge; × *Syringa josiflexa* var. 'Bellicent' Ogilvie-Grant, M., Kew; seeds. Ogilvy, J., Forfar; cuttings. Orchard Neville Nursery, Baltonsborough; plants. Oslo University Botanic Garden; seeds Owen, Miss M. J. N. Wales; corms. Oxford University B G.; cuttings. Palmer, Hon. Lewis, Sutton Scotney; seeds, cuttings, shrubs and *Veronica macrantha*. Pam, Major A., Broxbourne; seeds and plants Paris & McLaren, Oxford; plants and cuttings. Parsons, Mrs. I., *Asclepias curassavica*. Pearce, R. D., Moorestown; seeds. Pennell, J., Kingston Hill; seeds Perry, Amos, Enfield; plants. Pettit, H. H., Egham; grafting wood Pike, Albert, V., Buxted Park Gardens; cuttings and seeds. Pinetree Farm; plants. Pinsent, Roy, Birmingham; *Lilium Martagon album* Poe, Miss, Ireland; plants. Prynne, Col., Kew; cuttings, plants and seeds. Rampton, K. H., Ashford; seeds. Renton, J., Branklyn; plants. Renshaw, Sir S., Great Fransham; seeds. Rietsema, Dr. J., Holland; cuttings. Robb, A. J., Rowlands Castle; seeds. Roberts, J. H., Ottershaw; plants. Roberts, W., West Bridgeford; seeds. Rose, F. J., Southampton; bulbs and plants. Rose, Mrs., West Clandon; cuttings. Rosenhein, Dr. O., London; seeds. Rothschild, Major E.; shrubs, cuttings and plants. Russell, J., Sunningdale Nurseries; Rhododendrons and corms. Sanderson, K. W., Leeds; cuttings. Scutes Farm, Hastings; scions. Sexton, C. E., Redhill; seeds. Shand, P. Morton, Bath; grafting wood. Shepherd, J. W., Trowbridge; grafting wood. Smith, H., Westcliffe-on-Sea; plants. Sleigh, H. R., Ashcote; grafting wood. Slocock, W. C. Ltd., Woking; plants. Solly, Mrs. H., Canterbury; Iris. Sopper, Col. F., Gorthleck; bulbs, seeds and plants. Souster, J., Australia; seeds. Stacey, H., Chesham; grafting wood. Stair, The Earl of, Stranraer; bulbs. Steele, R. L., Esher; cuttings. Stent, A. J., Nyasaland; seeds. Stern, Col. F. C., Goring-by-Sea; seeds. Stevenson, J. B., Ascot; a collection of Rhododendrons, cuttings and seeds. Streeter, F., Petworth Park; seedlings. Struchbury, A. E., Upminster; seeds. Swansea, Parks Dept.; cuttings. Swinborne, Mrs. L. G., Battle; bulbs. Trotter, R. D., Ockley; seeds, plants and corms. Tuck, Mrs. K. M., Kings Lynn; grafting wood. Tustin, F., Stow-on-the-Wold; seeds. Wade, R. C., Brent Knoll; corms. Wagstaff, J., Thorpe Salvin; grafting wood. Waley, F., Sevenoaks; plants, seeds and *Pyrola carinata*. Ward, Capt. F. K.; seeds. Wardington, Lady, Wardington; seeds. Waterer Sons & Crisp, Twyford; plants and shrubs. Waterfield, Mrs., Little Bookham; seeds and a Sedum from Madeira. Watson, J. H., Prior's Marston; grafts. Webb, H. W., Lymington; seeds. Weekes, A. J., Limpsfield Common; plants. Wells, Dr. A. Q., Kidlington; seeds, plants and cuttings. Weston, T. A., New York; seeds. Wheeler, C. H., Ospringe; bulbs. Williams, C., Gorran; cuttings. Wilkins, Miss W. E., Rye; grafting wood. Wilson, Lt.-Col., A. R. G., Asmara; seeds. Wilson, F. R. L., Godalming; plants. Woods, W. P., Caterham; Fuchsia 'Kathleen.' Yonge, Mrs., D. M., Yealmpton; seeds. Zufelt, Rev. V. E. R., Ontario; seeds.

EXTRACTS FROM THE PROCEEDINGS
OF THE
ROYAL HORTICULTURAL SOCIETY.

FEBRUARY 18, 1947.

NARCISSUS AND TULIP COMMITTEE.—Mr. E. A. Bowles, F.L.S., F.R.E.S., in the Chair, and twelve other members present.

Awards Recommended :

Silver-gilt Flora Medal.

To Messrs. R. H. Bath, Ltd., Wisbech, for an exhibit of Daffodils.

Banksian Medal.

To Messrs Wakeley Bros. & Co., Ltd., Bankside, London, S.E. 1, for an exhibit of Daffodils and Tulips.

First-class Certificate.

To *Narcissus* ' Cragford ' as a variety for forcing for market (voting unanimous) Raised by the late P D. Williams and shown by Messrs. G. Zandbergen-Terwegen, Sassenheim, Holland.

Other Exhibits.

Narcissus ' Armada,' shown by Messrs. G. Zandbergen-Terwegen. The Committee desired to see this plant again when flowers from the open are available.

MARCH 4, 1947.

SCIENTIFIC COMMITTEE.—Mr. E. A. Bowles, M A , F.L.S., F.R.E.S.. V.M.H., in the Chair, and five other members present.

Fasciation in Cryptomeria —Mr. Murray Hornibrook wrote in reference to the specimen of *Cryptomeria elegans* with fasciated shoots shown on October 20, 1946, that several varieties of this species are described as having fasciated branches, viz var *pygmaea*, described by Loudon in 1850, being the oldest (var. *nana* of Knight & Perry) ; var *monstrosa*, *monstrosa nana* and *knaptonensis*. He had also seen fasciation in var *Bandai Sugi* and in var *albo-variegata*. He drew attention to a fine specimen of var *cristata* (under which name Commander Gilliland showed the specimen) at Kilmacurragh, which in 1932 measured 9 feet high by 12 feet through, and of *monstrosa nana* at Leonardslee, planted about 1880, which in 1925 had grown into a dense bush 5 feet high and 5 feet through.

Fruit of Arbutus Menziesii —Mr Donald W Smith, writing from Oregon, said : " *Arbutus Menziesii* is one of the most common trees in this locality and here the fruit is blood-red Some years they bear more heavily than others. A couple of years ago there were masses of fruit An interesting feature of the leaves at night along the roads when headlights of the car shine on them is that the underside seems to glow like phosphorus. Where they stand free of other trees the flowers seem to be more profuse, some of them solid masses of bloom."

Silver Firs.—Commander Gilliland sent a series of shoots of Silver Firs from his garden, drawing attention to variation in foliage. The specimens shown were the following five of *Abies Forrestii :* (1) From a plant received from Kew about 1930 bearing curved leaves with stomata on the upper side, those of the leading shoot of 1946 with very pointed leaves compared with the blunt ones of the previous year. (2) Plant received from Kew, 1934, which had coned once, with no pointed leaves. (3) Plant from Messrs Hillier with pointed leaves on 1946 shoots, blunt, notched ones on shoots of previous years. (4) Plant from Donard Nursery Co., which, though healthy, has smaller leaves than the others, none of them pointed. (5) Plant raised from seed received from Edinburgh with pointed leaves, some of which were inclined to recurve. He also sent a shoot of *A. Fabri* with marked radial growth and a tendency to recurve, and of *A. recurvata* with recurved leaves (which, however, were less recurved than is sometimes seen).

Peculiar Potato.—Mr. T. Dawson Thelwall of The Cottage, Cobham, Surrey, sent a potato of peculiar form, consisting of a large oval tuber, itself weighing over 1 lb., which had produced five lateral growths each nearly spherical and weighing about 6 ounces, attached by a broad base to the larger portion. They were no doubt " second-growths," possibly induced by the wet autumn of 1946, the main growth showing signs of second-growth at the rose end.

FRUIT AND VEGETABLE COMMITTEE.—Mr. F. A. Secrett, V.M.H., in the Chair and seventeen other members present.

Exhibit.

Seedling Apple from W. T. Kiddle, Esq., The Nursery, Fetherston Road, Stanford-le-Hope, Essex.

FLORAL COMMITTEE A.—Mr. G. W. Leak, V.M.H., in the Chair, and fourteen other members present.

Awards Recommended :

Silver Flora Medal.

To Messrs. Allwood Bros., Haywards Heath, for an exhibit of Carnations.

Banksian Medal.

To Messrs. Wakeley Bros., & Co., Ltd., London, for an exhibit of Daffodils, Tulips, Crocuses and *Iris reticulata.*

Cultural Commendation.

To Clive Cookson, Esq., Nether Warden, Hexham, for four very fine red and carmine Hippeastrum seedlings raised from the collection which originally belonged to the late Lt.-Col. Sir George Holford, K.C.V.O., C.I.E.

Selected for trial at Wisley.

Freesia 'Caro Carlée,' 'Delight' (to be renamed), 'Glorious Victory' and 'Snowdrift,' from Pango Horticultural Co., Ltd., Spalding.

Primula malacoides 'Attraction,' 'Grandeur' and 'Princess,' from Messrs. Sutton & Sons, Ltd., Reading.

Primula sinensis stellata 'Fire King,' from Messrs. Sutton & Sons, Ltd., Reading.

FLORAL COMMITTEE B.—Mr T. Hay, C.V.O., V.M.H., in the Chair, and eleven other members present.

Awards Recommended :

Silver Banksian Medal.

To Mr. K. W. Harle, Lower Basildon, for an exhibit of succulents.

Flora Medal.

To Messrs. M. Prichard & Sons, Ltd., Christchurch, for an exhibit of shrubs and bulbous plants.

Banksian Medal.

To Elstead Nurseries, Godalming, for an exhibit of shrubs and bulbous plants.

To Messrs. R. Wallace & Co., Tunbridge Wells, for an exhibit of bulbous plants.

NARCISSUS AND TULIP COMMITTEE.—Mr. E. A. Bowles, F.L.S., F.R.E.S., V.H.M., in the Chair, and eleven other members present.

Awards Recommended :

Silver-gilt Banksian Medal.

To Messrs. R. H. Bath, Ltd., Wisbech, for an exhibit of Daffodils and Tulips.

Silver Flora Medal.

To The Trenoweth Valley Flower Farm, Ltd., St. Keverne, Cornwall, for an exhibit of Daffodils.

ORCHID COMMITTEE.—Mr. Gurney Wilson, F.L.S., V.M.H., in the Chair, and seven other members present.

Awards Recommended :

Award of Merit.

To *Cymbidium* 'Innamorata' var. 'Lycaste' ('Dante' × 'Rosanna') (votes 7 for, 0 against), from Messrs. Black & Flory, Slough.

To *Cymbidium* 'Queen Elizabeth' var. 'Enchantress' ('Olympus' × 'Flamingo'), (votes 7 for, 0 against), from Messrs. H. G. Alexander, Ltd., Tetbury, Glos.

To *Lycaste* 'Sunrise' var. 'Fiona' (*Skinneri alba* × *Imschootiana*) (votes 7 for, 0 against), from McBean's Orchids, Ltd., Cooksbridge.

Preliminary Certificate.

To Laeliocattleya 'Desmond Sander' (*C.* 'Remy Chollet' × *Lc.* 'Harpenden'), (votes 7 for, 0 against), from Messrs. Sanders, St. Albans.

Cultural Commendation.

To Messrs. Sanders, St. Albans, for a well-cultivated plant of *Neomoorea irrorata*, with four many-flowered spikes.

Other Exhibits included:

Cymbidium 'Swallow' and *Cymbidium* 'Diadem' from G. P. Harben, Colbury House, Totton.

MARCH 18, 1947

SCIENTIFIC COMMITTEE.—Mr. E. A. Bowles, M A., F.L.S., F.R.E.S., V.M.H., in the Chair, and six other members present

Aberrant Gladiolus.—Mr. C L Piesse, of Moondoo, Bassendean, West Australia, sent particulars of a Gladiolus plant (var 'Paradise') which, grown from a 4 inch corm, produced a corm of 1½ inch diameter on the stem 12 inches above ground, and a second of the same size 1 foot higher The lower one grew out and produced a flower spike. It grew in Mr Gulvin's garden at Collie, West Australia. The production of aerial corms or bulbs is not unusual in Monocotyledons but they rarely grow out to flower in the year of production.

Snowdrops.—Mr Bowles showed a number of Snowdrops from his garden and drew attention to the two types of growth seen in the genus; in one, typified by *Galanthus nivalis*, the usual two leaves to the bulb are flat, face to face in the bud, while in the other they are wrapped round one another in the bud. The sheath of *G. latifolius* remains herbaceous and tubular for a greater length than in other species. He observed that the flowers of a clump all arch in the same direction as though growth of the pedicel was greater on one side, apparently that least illuminated, than on the other.

FLORAL COMMITTEE A.—Mr. G. W. Leak, V.M.H., in the Chair, and thirteen other members present.

Awards Recommended:

Silver-gilt Banksian Medal.

To Messrs R. H. Bath, Ltd., Wisbech, for an exhibit of Freesias.

Silver Flora Medal.

To Messrs. Allwood Bros, Haywards Heath, for an exhibit of Carnations.

Flora Medal.

To Messrs W. A Constable, Ltd., Tunbridge Wells, for an exhibit of Lachenalias and other bulbs.

Selected for Trial at Wisley.

Freesias 'Carmen,' 'Goldcup,' 'Magnificence,' 'Neptune,' 'Orange-Nassau,' from Parigo Horticultural Co, Ltd, Spalding

FLORAL COMMITTEE B.—Mr. T. Hay, C.V.O., V.M.H., in the Chair, and fifteen other members present.

Awards Recommended:

Silver Banksian Medal.

To Mr. K. W. Harle, Lower Basildon, for an exhibit of succulents.

To Mr. G. G. Whitelegg, Chislehurst, for an exhibit of rock garden plants.

Flora Medal.

To Messrs. M. Prichard & Sons, Ltd, Christchurch, for an exhibit of shrubs and bulbous plants.

To Orchard Neville Nurseries, Baltonsborough, for an exhibit of rock garden plants.

Banksian Medal.

To Messrs. Burkwood & Skipwith, Ltd., Kingston-on-Thames, for an exhibit of shrubs.

To Mr. M. P. Kooper, Ferndown, for an exhibit of shrubs and bulbous plants.

To Mr. F. Street, Woking, for an exhibition of hardy Heaths.

Other Exhibit.

Iris histrio var. *aintabensis*, exhibited by Col. F. C. Stern, O.B.E., M.C., Highdown, Goring-by-Sea.

NARCISSUS AND TULIP COMMITTEE.—Mr. E. A. Bowles, F.L.S., F.R.E.S., V.M.H., in the Chair, and nineteen other members present.

Awards Recommended:

Silver-gilt Flora Medal.

To Messrs. R. H. Bath, Ltd., Wisbech, for an exhibit of Daffodils and Tulips.

Silver-gilt Banksian Medal.

To Messrs. Southern Growers, Ltd., Groombridge, for an exhibit of Daffodils and Tulips.

Flora Medal.

To the Trenoweth Valley Flower Farm, St. Keverne, Cornwall, for an exhibit of Daffodils.

Revised Classification of Daffodils.

The Revised Classification of Daffodils was considered and it was unanimously recommended that it be adopted and that it should come into force on January 1, 1949.

ORCHID COMMITTEE.—Mr. GURNEY WILSON, F.L.S., V.M.H., in the Chair, and nine other members present.

Awards Recommended:

Silver Gilt Banksian Medal.

To Messrs. Charlesworth & Co., Haywards Heath, for a group of Orchid species and hybrids.

Award of Merit.

To *Cymbidium* ' Imbros ' (*Lowianum* × ' Rosanna ') (votes 6 for, 3 against), from Read's Hybridizing Nurseries, Hockley.

Preliminary Commendation.

To *Cymbidium* ' Glasgow ' var. ' Moonbeam ' (*Alexanderi* × *eburneo-Lowianum*, (votes 6 for, 2 against), from G. P. Harben, Esq., Colbury House, Totton, Hants.

Cultural Commendation.

To Mr. E. R. J. Lampard, 77 Lausanne Road, Peckham, S.E. 15, for *Cymbidium* ' Solent,' with a tall spike of eighteen rose-coloured flowers.

JOINT ROCK-GARDEN PLANT COMMITTEE.—IRIS, Lady LAWRENCE, V.M.H., in the Chair, and six other members present.

Awards Recommended:

Award of Merit.

To *Primula* × *scapeosa* (*P scapigera* × *P. bracteosa*) as a flowering plant for the Alpine house (votes unanimous), from Mr. R. B. Cooke, Kilbride, Corbridge, Northumberland.

Other Exhibits.

From Mr. R. B. Cooke, Kilbride, Corbridge, Northumberland, *Primula bracteosa*.

APRIL 1, 1947.

SCIENTIFIC COMMITTEE.—Mr. E. A. BOWLES, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and five other members present.

White forms of Daphne Mezereum —The occurrence of different forms of white-flowered *Daphne Mezereum* was commented upon, the main differences being seen in height and vigour of growth, in the tint of the flowers and in the colouring of the fruits. Seedlings of the white forms appear usually to be white-flowered.

Colorado Beetle.—Attention was drawn to the fact that Colorado Beetles have on more than one occasion been brought into this country with produce from the Continent during the present spring and to the need for vigilance regarding this pest which is a menace to the potato crop and which is known to be able to survive the winter in the adult state in this country, where, fortunately, owing to vigorous action on the part of the Ministry of Agriculture, it has not yet become established, though now thoroughly acclimatized since the 1914–18 war on the Continent.

Various Cyclamen.—Mr. Bowles showed a number of species of Cyclamen from his garden, including the very fragrant wild form of *C. persicum* with small flowers from the island of Rhodes, a pale pink form of *C. repandum*, *C. creticum*, usually white, very rarely pink, and *C. africanum*, a species with large leaves which he has growing under glass.

EXTRACTS FROM THE PROCEEDINGS
OF THE
ROYAL HORTICULTURAL SOCIETY.

GENERAL MEETINGS

APRIL 1, 1947

FRUIT AND VEGETABLE COMMITTEE.—Mr. E. A. L. LAXTON, V.M.H., in the Chair, and thirteen other members present.

Exhibits.

Apple 'Belvoir Castle,' from His Grace the Duke of Rutland, Belvoir Castle, Grantham, Lincs.

Seedling Apple, from Mr. S. H. Jeans, 4 The Terrace, Bray-on-Thames, Berks.

FLORAL COMMITTEE A.—Mrs. H. LINDSAY SMITH in the Chair, and eleven other members present.

Awards Recommended:

Silver-gilt Banksian Medal.

To Messrs, Allwood Bros., Ltd., Haywards Heath, for an exhibit of Carnations and *Dianthus Allwoodii.*

Silver Banksian Medal.

To Messrs. A. W. Constable, Ltd., Tunbridge Wells, for an exhibit of Lachenalias, Irises, and other bulbous plants.

Flora Medal.

To Messrs. Thomas Carlile, Ltd., Twyford, for an exhibit of coloured Primroses.

To Messrs. Wakeley Bros., Ltd., London, for an exhibit of Daffodils, Tulips, Crocuses and Hyacinths.

Banksian Medal.

To Messrs. Biddlecombe Bros., Bracknell, for an exhibit of Carnations.

Other Exhibit.

Primula 'Juliet,' from Mrs. D. Apted, Newlyn, Penzance.

FLORAL COMMITTEE B.—Lord ABERCONWAY, C.B.E., V.M.H., in the Chair, and fifteen other members present.

Awards Recommended:

Silver-gilt Flora Medal.

To Southern Growers, Ltd., Hollamby's Nurseries, Groombridge, for an exhibit of Azaleas, Tulips and Narcissi.

Silver-gilt Banksian Medal.

To the Belgian Ministry of Agriculture, for an exhibit of Azaleas.

Silver Flora Medal.

To the Astolat Co., Ltd., Guildford, for an exhibit of rock garden plants.

To Messrs. Hillier & Sons, Ltd., Winchester, for an exhibit of flowering trees and shrubs.

Silver Banksian Medal.

To Orchard Neville Nurseries, Baltonsborough, for an exhibit of rock garden plants.

To Winkfield Manor Nurseries, Ascot, for an exhibit of rock garden plants and shrubs.

Flora Medal.

To Elstead Nurseries, Godalming, for an exhibit of rock garden plants.

To Mr. K. W. Harle, Lower Basildon, for an exhibit of succulents.

To Messrs. L. R. Russell, Ltd., Windlesham, for an exhibit of flowering shrubs.

Banksian Medal.

To Lt.-Col. L. H. Brammall, Salisbury, for an exhibit of rock garden plants.

To Messrs. Burkwood & Skipwith, Ltd., Kingston, for an exhibit of flowering shrubs.

To Mr. M. P. Kooper, Ferndown, for an exhibit of rock garden plants and shrubs.

To Messrs. M. Prichard & Sons, Ltd., Christchurch, for an exhibit of rock garden plants and shrubs.

Award of Merit.

To *Camellia* 'St. Ewe' (*japonica* × *saluenensis* dark form) as a hardy flowering shrub (votes unanimous), from C. Williams, Esq., M.P., Caerhays Castle, Gorran, Cornwall. (See p. 288.)

To *Daphne Mezereum alba* 'Bowles' Variety' as a hardy-flowering shrub (votes 10 for, 0 against), from E. A. Bowles, Esq., M.A., F.L.S., V.M.H., Myddelton House, Bulls Cross, Enfield. (See p. 290.)

Other Exhibits

Daphne Mezereum, 'Byford's Variety,' exhibited by E. A. Bowles, Esq.

Leucojum vernum, exhibited by Lord Digby, D.S.O., M C., Dorchester.

ORCHID COMMITTEE.—Mr. GURNEY WILSON, F.L.S., V.M.H., in the Chair, and twelve other members present.

Awards Recommended :

Gold Medal.

To Guy P. Harben, Esq., Colbury House, Totton, Hants, for a superb group of about 150 well-flowered Cymbidiums.

First-class Certificate.

To *Cymbidium* 'Swallow' var. 'Oriole' (*Pauwelsii* × *Alexanderi*), (votes 8 for, 2 against) from Guy P. Harben, Esq., Colbury House, Totton, Hants. (See p. 289.)

Award of Merit.

To *Cymbidium* 'Bodmin Moor' var. 'Grace' (*Alexanderi* × 'Erica Sander'), (votes 12 for, 0 against), from Mr. Clint McDade, Chattanooga, Tennessee, U.S.A. (See p. 289)

To *Odontonia* 'Cephelia' (*Odontoglossum* 'Celius' × *Odontonia* 'Ophelia'), (votes 10 for, 0 against), from Messrs. Charlesworth & Co., Haywards Heath. (See p. 291.)

Preliminary Commendation.

To *Cymbidium* 'Miretta' ('Claudette' × 'Mirabel'), (votes 8 for, 0 against), from McBean's Orchids, Ltd., Cooksbridge.

To *Cymbidium* 'Adele Sander' ('St. Alban' × *Alexanderi*), (votes 9 for, 0 against), from Messrs. Sanders, St. Albans.

Cultural Commendation.

To Mr. R. E. Farmer, Dell Park Gardens, Englefield Green, Surrey, for a superb example of *Laeliocattleya Schroederae*, with a spike of seven large and fully developed flowers.

Other Exhibits.

Cymbidium 'Hawfinch' var. 'Daffodil,' from Sir William Cooke, Bt., Wyld Court, Hampstead-Norris.

Cymbidium 'Alrita,' from Lt.-Col. the Hon. H. S. Tufton, Castle Hill, Englefield Green.

Cymbidium 'Mildred Hunter,' from Messrs. Black & Flory, Slough.

Cymbidium 'Lantern ('Gillian' × 'Pearl') from Messrs. H. G. Alexander, Ltd., Tetbury.

Oncidium Papilio, from Frank M. Wyatt, Esq., Tilgate, Sussex.

NARCISSUS AND TULIP COMMITTEE.—Mr. E. A. BOWLES, F.L.S., F.R.E.S., V.M.H., in the Chair, and twenty other members present.

Awards Recommended :

Award of Merit.

To *Narcissus* 'Golden Torch' as a variety for exhibition (voting unanimous). Raised by the late Brodie of Brodie and shown by Mr. Guy L. Wilson, The Knocken. Broughshane, co. Antrim, N. Ireland. (See p. 290.)

Silver-gilt Banksian Medal.

To Mr. W. J. Dunlop, Dunrobin, Ballymena, N. Ireland, for an exhibit of Daffodils.

Silver Flora Medal.

To the Trenoweth Valley Flower Farm, St. Keverne, Cornwall, for an exhibit of Daffodils.

To Messrs. Barr & Sons, 11/13 King Street, Covent Garden, W.C. 2, for an exhibit of Daffodils.

Silver Lindley Medal.

To Mr. Alec Gray, Treswithian Daffodil Farm, Camborne, Cornwall, for an exhibit of Miniature Daffodils.

Silver Banksian Medal.

To Messrs. R. Wallace & Co., The Old Gardens, Tunbridge Wells, for an exhibit of Daffodils and Tulips.

Banksian Medal.

To Messrs. Feilden & Crouch, Fairseat Nurseries, Wrotham, Kent, for an exhibit of *Narcissus* ' Fairy Wings.'

Other Exhibits.

Narcissus ' Rubra,' shown by Mr. W. J. Dunlop. The Committee desired to see this plant again when flowers from the open are available.

JOINT ROCK-GARDEN PLANT COMMITTEE.—Col. F. C. STERN, O.B.E., M.C., F.L.S., V.M.H., in the Chair, and five other members present.

Exhibits.

Ranunculus montanus (shown as R. ' Thora '), from Messrs. M Prichard & Sons, Ltd., Christchurch, Hants.

A *Salix* sp that the Committee desire to see again when in leaf, from Mrs. G. Anley, St. George's, Wych Hill Lane, Woking.

APRIL 15, 1947

SCIENTIFIC COMMITTEE.—Mr. E A. BOWLES, M A , F L.S , F.R E S., V.M.H., in the Chair, and seven other members present

Colorado Beetle —Mr. Edelsten drew attention to the fact that since the last meeting a further importation of the Colorado Beetle had been discovered There are many ways in which this beetle can be brought into this country since it is now widespread on the Continent, making prompt recognition of its presence here all the more imperative.

Scilla bithynica —A beautiful azure Scilla was referred to the Committee from Floral Committee B. before which it had been shown by Mr Collingwood Ingram as *S. monophyllos*. Dr. Turrill found it to be *S bithynica* illustrated in the BOT. MAG. t 9230, a relative of *S. amoena* and *S. verna* and native of Asia Minor and S.E Europe.

Aberrant Leucojum —Mr. Lewis Palmer showed a curious inflorescence of *Leucojum vernum carpathicum* in which the scape up to and including the spathe was adnate to a leaf.

FLORAL COMMITTEE A.—Mr. G. W. LEAK, V.M.H , in the Chair, and twelve other members present.

Awards Recommended :

Silver Flora Medal.

To Messrs. Allwood Bros., Ltd., Haywards Heath, for an exhibit of Carnations.

Silver Banksian Medal.

To Messrs. Allwood Bros., Ltd., Haywards Heath, for an exhibit of *Dianthus Allwoodii* and garden Pinks.

To Messrs. Blackmore & Langdon, Bath, for an exhibit of Schizanthus, Polyanthus and coloured Primroses

Flora Medal.

To Bermondsey Borough Council, Bermondsey, for a group of Cinerarias.

To Messrs. Thomas Carlile, Ltd., Twyford, for a group of hardy Primulas.

To Mr. M. P. Kooper, Ferndown, for a group of Daffodils, coloured Primroses, and shrubs.

Banksian Medal.

To Mr. E. Ballard, Colwall, for an exhibit of Helleborus hybrids and species.

Other Exhibits.

Gold Laced Polyanthus seedlings from C. J Howlett, Esq., Earley.

Roses from Messrs. Wheatcroft, Bros., Nottingham.

FLORAL COMMITTEE B.—Lord ABERCONWAY, C.B E , V.M.H., in the Chair, and eighteen other members present.

Awards Recommended :

Silver-gilt Banksian Medal.

To Six Hills Nurseries, Ltd., Stevenage, for an exhibit of Primulas and other alpine plants.

Silver Flora Medal.

To Mr. G. E. Welch, Cambridge, for an exhibit of rock garden plants.

To Winkfield Manor Nurseries, Ascot, for an exhibit of shrubs and rock garden plants.

To the Astolat Co., Ltd., Guildford, for an exhibit of Primulas and other rock garden plants.

Silver Banksian Medal.

To the Donard Nursery Co., Newcastle, Co. Down, for an exhibit of flowering shrubs.

Flora Medal.

To Elstead Nurseries, Godalming, for an exhibit of rock garden plants.

To Mr. K. W. Harle, Lower Basildon, for an exhibit of succulents.

To Mrs. H. Mearle, Enfield, for an exhibit of varieties of *Primula Allionii.*

To Orchard Neville Nurseries, Baltonsborough, for an exhibit of rock garden plants.

To Messrs. M. Prichard & Sons, Ltd., Christchurch, for an exhibit of rock garden plants.

To Southern Growers, Ltd., Groombridge, for an exhibit of Japanese Azaleas.

To Messrs. Waterer, Sons & Crisp, Ltd., Twyford, for an exhibit of rock garden plants.

To Mr. G. G. Whitelegg, Chislehurst, for an exhibit of Rhododendrons.

To Messrs. Wm. Wood & Sons, Ltd., Taplow, for an exhibit of flowering shrubs and Primulas.

Banksian Medal.

To Messrs. Burkwood & Skipwith, Ltd., Kingston-on-Thames, for an exhibit of flowering shrubs.

To Messrs. Robinson, Eltham, for an exhibit of rock garden plants.

To Mr. S. Sims, Draycott, for an exhibit of Primulas and conifers.

To Mr. W. Kibble, Bagshot, for an exhibit of rock garden plants.

First Class Certificate.

To *Magnolia mollicomata* 'Lanarth' (Forrest 25655) as a hardy flowering tree (votes 11 for, 0 against), from Mr. M. Williams, Lanarth, St. Keverne. (See p. 290.)

To *Magnolia Sargentiana* var. *robusta* as a hardy flowering tree (votes unanimous), from Lord Aberconway, C.B.E., V.M.H., Bodnant. (See p. 291.)

Award of Merit.

To *Prunus* × Incam var 'Okamé' (*incisa* × *campanulata*) as a hardy flowering tree (votes unanimous), from Capt. Collingwood Ingram, Benenden.

To *Scilla monophylla* (subject to verification of name) as a hardy flowering plant (votes 10 for, 0 against), from Capt Ingram.

Cultural Commendation.

To the Astolat Co., Ltd., Guildford, for a group of *Primula rosea grandiflora.*

Other Exhibits.

Forsythia × *clandonensis* (*ovata* × *suspensa*), exhibited by A. Simmonds, Esq., Harmsworth's, West Clandon.

Forsythia × *intermedia*, Lynwood Variety, exhibited by the Donard Nursery Co., Newcastle, Co. Down.

ORCHID COMMITTEE.—Mr. GURNEY WILSON, F.L.S., V.M.H., in the Chair, and thirteen other members present.

Awards Recommended:

Gold Medal.

To Messrs. Sanders, St. Albans, for a group of Cymbidiums.

Silver Flora Medal.

To Messrs. Stuart Low & Co., Jarvis Brook, for a group of Dendrobiums.

To Messrs. Charlesworth & Co., Haywards Heath, for a group of Orchids.

Award of Merit.

To *Brassolaeliocattleya* 'Nugget' (*Blc.* 'Palmyra' × *Lc. luminosa* (votes 11 for, 0 against), from Messrs. Sanders, St. Albans. (See p. 288.)

To *Cymbidium* 'Nefertiti' var. 'Celeste' ('Pervaneh' × *Alexanderi*), (votes 10 for, 1 against), from Messrs. H. G. Alexander, Tetbury, Glos. (See p. 289.)

NARCISSUS AND TULIP COMMITTEE.—Mr. E. A. Bowles, F.L.S., F.R.E.S., V.M.H., in the Chair, and twenty-four other Members present.

The Peter Barr Memorial Cup.

It was unanimously recommended that the Peter Barr Memorial Cup, which is awarded annually to someone who has done good work on behalf of the Daffodil, be awarded to the Rev. Canon Rollo Meyer for his work as a raiser and exhibitor of Daffodils, and as a Member of the Narcissus and Tulip Committee.

Awards Recommended:

First-class Certificate.

To *Narcissus* 'Trousseau' as a variety for exhibition (voting unanimous). This handsome bicolor Trumpet variety (Division 1c), raised by the late P. D. Williams and shown by Mr. J. L. Richardson, Prospect House, Waterford, received an Award of Merit on March 20, 1945 (*See* R H S Journal, LXX, p. 245, 1945.)

To *Narcissus* 'Armada' as a variety for exhibition (voting unanimous). This well-formed Incomparabilis variety, raised by Mr. Guy L. Wilson and shown by Messrs. G. Zandbergen-Terwegen, Sassenheim, Holland, received an Award of Merit on March 20, 1945. (*See* R.H.S Journal, LXX, p. 214, 1945.)

Award of Merit.

To *Tulip* 'Sparkling Eye' (votes 11 for, 0 against). Shown by Messrs. R. Wallace & Co., The Old Gardens, Tunbridge Wells.

Preliminary Commendation.

To *Narcissus* 'Statue' as a variety for exhibition (votes 13 for, 2 against). A bicolor Incomparabilis variety (Division 2b). Raised by Mr. J. L. Richardson and shown by Major C. B. Habershon, Hesterworth, Aston-on-Clun, Shropshire.

Gold Medal.

To Mr. J. L. Richardson, for an exhibit of Daffodils.

Silver-gilt Flora Medal.

To Messrs. Barr & Sons, 13 King Street, Covent Garden, London, W.C. 2, for an exhibit of Daffodils

To G. H. Johnstone, Esq., Trewithen, Grampound Road, Cornwall, for an exhibit of Daffodils.

To The Trenoweth Valley Flower Farm, St. Keverne, Cornwall, for an exhibit. of Daffodils.

Silver-gilt Banksian Medal.

To Messrs. R. Wallace & Co., for an exhibit of Daffodils and Tulips.

Silver Flora Medal.

To Messrs. Dobbie & Co , Edinburgh, for an exhibition of Tulips.

To Mr. R. Perks, Berrow, Somerset, for an exhibit of Daffodils.

To Mr. Guy L. Wilson, Broughshane, Co. Antrim, for an exhibit of Daffodils.

Silver Lindley Medal.

To Mr. Alec Gray, Treswithian Daffodil Farm, Camborne, for an exhibit of miniature Daffodils.

Banksian Medal.

To Messrs. Lower and Partridge, Starcross, Devon, for an exhibit of Daffodils.

To The Slieve Donard Nursery Co., Newcastle, Co. Down, for an exhibit of Daffodils.

To Messrs. Wakeley Bros. & Co , Ltd., Bankside, S.E. 1, for an exhibit of Tulips and Daffodils.

Plants Selected for Trial.

Narcissus 'Goring,' shown by Colonel F. C. Stern, F.L.S., V.M.H., Highdown, Goring-by-Sea.

Tulip Hybrids 'Vivaldi,' 'Robert Schumann,' 'Edwin Fischer,' and 'Fritz Kreisler,' shown by Messrs. R. Wallace & Co.

Plants to be Seen Again.

The Committee expressed a desire to see again, when blooms from the open are available, Tulips 'Szweelinck' and 'Mendelssohn,' shown by Messrs. Hewitt & Co., Banbury Road, Stratford-upon-Avon.

JOINT ROCK-GARDEN PLANT COMMITTEE.—IRIS, Lady LAWRENCE, V.M.H., in the Chair, and five other members present.

Award Recommended :

Award of Merit.

To *Primula sp.* (subject to naming) as a flowering plant for the rock garden and alpine house (votes unanimous), from Lord Aberconway, C.B.E., V.M H., Bodnant, N. Wales.

Other Exhibits.

Androsace carnea var. *eximia*, exhibited by Mrs. D. E. Saunders, Husseys, Green Street Green, Farnborough.

Saxifraga 'Myra' Cambria var., exhibited by Mr. G. E. Welch, Cambria Nurseries, Cambridge.

APRIL 22, 1947

JOINT PERPETUAL FLOWERING CARNATION COMMITTEE.—Mr. G. MONRO, C.B.E., V.M.H , in the Chair, and eight other members present.

Exhibit.

Eastern Wonder, raised and shown by Messrs. Allwood Bros. Ltd., Wivelsfield Nurseries, Haywards Heath, Sussex.

JOINT ROCK GARDEN PLANT COMMITTEE.—Dr. P. L. GIUSEPPI in the Chair, and eight other members present.

Awards Recommended :

Award of Merit.

To *Androsace imbricata*, as a flowering plant for the alpine house and rock garden (votes unanimous), from Mrs. C. B. Saunders, Husseys, Green Street Green, Farnborough, Kent.

To *Draba bryoides imbricata*, as a flowering plant for the alpine house and rock garden (votes unanimous), from Messrs. W. E. Th. Ingwersen Ltd., Birch Farm Nurseries, East Grinstead, Sussex.

To *Gentiana pumila*, as a flowering plant for the rock garden or alpine house (votes 7 for, 0 against), from Mrs. C. B. Saunders, and Gilbert White, Esq , Chinthurst, Warboys Road, Kingston Hill, Kingston, Surrey

To *Primula aureata*, as a flowering plant for the rock garden or alpine house (votes unanimous), from Mrs. Crewdson, Helne Lodge, Kendal.

Cultural Commendation.

To Mrs. C. B. Saunders, for the well-flowered pan of *Androsace imbricata*, which also received the A.M.

To G. H. Berry, Esq., "The Highlands," Ridgeway, Enfield, Middlesex, for a large pan of *Cassiope rigida* carrying a great number of buds the first of which were just expanding into fully opened blossoms.

Other Exhibits.

Draba mollissima, *Primulata marginata* × *Hyacinthia* and *Primula pubescens* var. 'Rufus,' from Messrs. W. E. Th. Ingwersen Ltd., Birch Farm Nursery, East Grinstead, Sussex.

Primula viscosa alba, from F M. Peacock, Esq., Lowlands Cottage, Beddington, Surrey.

Iris graeberiana, from Mrs. Gwendolyn Anley, St Georges, Wych Hill Lane, Woking.

APRIL 25, 1947

JOINT NARCISSUS COMMITTEE.—Mr. E. A. BOWLES, F.L.S., F.R.E.S., V.H.M., in the Chair, and nine other members present.

Awards Recommended :

First-class Certificate.

To *Narcissus* 'Kingscourt' as a variety for exhibition (voting unanimous). This very refined yellow Trumpet-variety (Division 1A) received an A.M., on April 14, 1942. See R.H.S. JOURNAL, LXVII, p. 277. Raised and shown by Mr. J. L. Richardson, Prospect House, Waterford.

To *Narcissus* 'Krakatoa,' as a variety for exhibition (votes 6 for, 0 against). This striking yellow-and-orange Incomparabilis variety (Division 2A), received an A.M. on March 20, 1945. See R.H.S. JOURNAL, LXX, p. 215. Raised and shown by Mr. J. L. Richardson.

Award of Merit.

To *Narcissus* ' Spitzbergen ' as a variety for exhibition (voting unanimous). Raised and shown by Mr. J. L. Richardson.

To *Narcissus* ' Statute,' as a variety for exhibition (voting unanimous). Raised by Mr. J. L. Richardson and shown by Major C. B. Habershon, Hesterworth, Aston-on-Clun, Craven Arms, Shropshire.

Other Exhibit.

Narcissus ' Garrick,' shown by Mr. J. L. Richardson.

APRIL 29, 1947

SCIENTIFIC COMMITTEE.—Mr. E. A. BOWLES, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and six other members present.

Double Muscari armeniacum.—Mrs Tudor of High Cross, Aldenham, sent flower spikes of a double form of *Muscari armeniacum* which had appeared in her garden three years ago and remained true The colour was that of the common form usually known as Muscari Heavenly Blue

Narcissus Bulbocodium × *N. triandrus*.—Mr. Gilmour showed flowers of a hybrid between *Narcissus Bulbocodium* × *N. triandrus* which occurs at Wisley among the parents The flowers are about intermediate between the parents, with a long narrow tube widening somewhat in the upper part much more markedly than in *N. triandrus*, segments narrow, about 1½ times as long as the trumpet-shaped pleated corona, stamens and style less declinate than in *N Bulbocodium*, 3 stamens about as long as corona or very slightly exserted, style scarcely exserted.

Jack in the Green Primrose.—Miss Mills of the Manor House, Pilberton, Warwickshire, sent Primroses in two or three colours with foliose sepals. This character appears to be transmissible by seed

Double Narcissus.—Prof. Weiss showed a Narcissus with all six stamens petaloid and somewhat funnel-shaped and one stigma also somewhat petaloid. The corona was not doubled but somewhat split

FRUIT AND VEGETABLE COMMITTEE.—Mr. F. A. SECRETT, V.M.H., in the Chair, and fourteen other members present

Selected for trial at Wisley.

Apple ' Montfort,' from A. E. Sadler, Esq , 22, Queen's Avenue, Woodford Green, Essex.

Other Exhibit.

Group of Strawberries, from Mr. H. S Melbourn, Pinetree Fruit Farm, Cranbourne, Dorset.

FLORAL COMMITTEE A.—Mr W. AUSTIN in the Chair, and twelve other members present.

Awards Recommended :

Silver-gilt Banksian Medal.

To Messrs. Allwood Bros., Ltd , Haywards Heath, for an exhibit of Carnations.

Silver Lindley Medal.

To John Innes Horticultural Institution, Merton, for an exhibit of Streptocarpus.

Silver Flora Medal.

To Messrs. Blackmore and Langdon, Bath, for an exhibit of Polyanthus.

To Messrs. Toogood & Sons, Ltd., Southampton, for an exhibit of Polyanthus and other hardy Primulas.

Silver Banksian Medal.

To Messrs. E. Webb & Sons (Stourbridge), Ltd., Stourbridge, for an exhibit of Schizanthus.

Flora Medal.

To Mr. J. W. Read, Hockley, for an exhibit of Pansies.

Banksian Medal.

To Messrs. Wheatcroft Bros., Ltd., Nottingham, for an exhibit of Roses.

Cultural Commendation.

To the Director, John Innes Horticultural Institution, Merton, S.W. 19, for Streptocarpus 'Constant Nymph' (S. Merton Blue × *S. Baudertii*).

Selected for trial at Wisley.

Primula denticulata 'Cambria Strain,' from Mr. G. E. Welch, Cambria Nurseries, Cambridge.

Streptocarpus 'Constant Nymph,' from the Director, John Innes Horticultural Institution, 31 Mostyn Road, S.W. 19.

Other Exhibits.

Blue Primrose, from E. Merrick Tylor, Esq., Pyrford, Surrey.

Polyanthus 'Delmonden Mauve,' from Dr. Maurice Amsler, Hawhurst.

Polyanthus, from C. J. Howlett, Esq., Earley, Reading.

Polyanthus, from Messrs. Wheatcroft Bros., Ltd., Nottingham.

FLORAL COMMITTEE B.—Lord ABERCONWAY, C.B.E., V.M.H., in the Chair, and nineteen other members present.

Awards Recommended :

Silver-gilt Flora Medal.

To Messrs. W. C. Slocock, Ltd., Woking, for an exhibit of Rhododendrons.

Silver-gilt Banksian Medal.

To the Commissioners of Crown Lands, Windsor, for an exhibit of Rhododendrons.

To Messrs. Hillier & Sons, Ltd., Winchester, for an exhibit of Rhododendrons.

Silver Flora Medal.

To Winkfield Manor Nurseries, Ascot, for an exhibit of rock garden plants.

Silver Banksian Medal.

To Elstead Nurseries, Godalming, for an exhibit of rock garden plants.

To Mr. G. Welch, Cambridge, for an exhibit of rock garden plants.

Flora Medal.

To Mr. K. W. Harle, Lower Basildon, for an exhibit of succulents.

To Mr. W. Kibble, Bagshot, for an exhibit of rock garden plants.

To Messrs. Reuthe, Keston, for an exhibit of Rhododendrons and Psoraleas.

Banksian Medal.

To Messrs. Burkwood & Skipwith, Ltd., Kingston, for an exhibit of flowering shrubs.

To Messrs. Cheal & Sons., Ltd., Crawley, for an exhibit of flowering shrubs.

To Orchard Neville Nurseries, Baltonsborough, for an exhibit of rock garden plants.

To Messrs. M. Prichard & Sons, Ltd., Christchurch, for an exhibit of rock garden plants.

To Messrs. Robinson, Eltham, for an exhibit of rock garden plants.

Award of Merit.

To *Lysichitum camtschatcense* as a hardy flowering plant for the water garden (votes 14 for, 0 against), from Lord Aberconway, C.B.E., V.M.H., Bodnant, N. Wales.

To *Magnolia Sprengeri diva* Seedling as a hardy flowering tree (votes 11 for, 0 against), from Lord Aberconway, C.B.E., V.M.H. (See p. 291.)

Other Exhibits.

Ilex Taria, exhibited by Lord Digby, D.S.O., from the Sidbury Manor Gardens.

Lysichitum americanum, *Magnolia Dawsoniana*, exhibited by Lord Aberconway.

Prunus cyclamina, *P. serrulata* 'Asano,' exhibited by Capt. C. Ingram, Benenden

Ribes sanguineum white variety, exhibited by C. J. Howlett, Esq., Reading.

Viburnum alnifolium, exhibited by the Commissioners of Crown Lands, Windsor.

EXTRACTS FROM THE PROCEEDINGS
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GENERAL MEETINGS

APRIL 1, 1947.

RHODODENDRON COMMITTEE.—Mr. J. B. STEVENSON, V.M.H., in the Chair, and ten other members present.

Awards Recommended:

Award of Merit.

To *Rhododendron* × *chrysomanicum* (*chrysodoron* ♀ × *burmanicum*) as a flowering shrub—tender except in the South-west (votes unanimous), from Lord Aberconway, C.B.E., V.M.H., Bodnant

To *Rhododendron* × *Golden Oriole* (*moupinense* ♀ × *sulfureum*) as a hardy flowering shrub (votes unanimous), from C. Williams, Esq., M.P., Caerhays Castle, Gorran R.S.O., Cornwall.

Other Exhibits.

R. × *Bric-a-Brac* (*moupinense* × *leucaspis*), exhibited by C. Williams, Esq., M.P.

R. Stewartianum F.25814, exhibited by Lord Digby, D.S.O., M.C.

APRIL 15, 1947.

RHODODENDRON COMMITTEE.—Mr. J. B. STEVENSON, V.M.H., in the Chair, and twelve other members present.

Awards Recommended:

First-class Certificate.

To Rhododendron 'Portia' (*strigillosum* × *euchaites*), as a hardy, early-flowering hybrid (votes unanimous), from Lord Aberconway, C.B.E., V.M.H., Bodnant. This outstanding hybrid received the A.M. on April 24, 1935, and is described in the R.H.S. JOURNAL, Vol. 60, p. 275 (June 1935).

Other Exhibits.

R. 'Chrycil' (*chrysodoron* × *cilpinense*), *R.* 'Fine Feathers' (*lutescens* × *cilpinense*), both raised and exhibited by Lord Aberconway.

APRIL 29, 1947

ORCHID COMMITTEE.—Mr. GURNEY WILSON, F L.S., V.M.H., in the Chair, and ten other members present.

Awards Recommended:

Silver Lindley Medal.

To Mr. B. Hills, Orchid grower to Major Edmund de Rothschild, Exbury House, Southampton, for a superb specimen of *Cymbidium* 'Swallow,' Exbury var., bearing five spikes with a total of 41 fully expanded flowers.

First-class Certificate.

To *Cymbidium* 'Swallow,' Exbury var. (*Pauwelsii* × *Alexanderi*), (votes 8 for, 0 against), from Major Edmund de Rothschild, Exbury House, Southampton.

Award of Merit.

To *Odontoglossum* 'Mary' (*triumphans* × 'Brimstone Butterfly'), (votes 9 for, 0 against), from Col. F. E. Griggs, The Spinney, Chislehurst, Kent.

To *Laeliocattleya* 'Talana' (*C.* 'Eleanore' × *Lc. Schroederae*), (votes 7 for, 0 against), from H. W. B. Schroder, Esq., Dell Park, Englefield Green, Surrey.

Cultural Commendation.

To F. M. Wyatt, Esq., Tilgate, Sussex, for two well-flowered plants of *Selenipedium* × *grande*.

NARCISSUS AND TULIP COMMITTEE.—Mr. E. A. BOWLES, F.L.S., F.R.E.S., V.M.H., in the Chair, and twelve other members present.

Tulip for naming.

A Tulip sent by R. D. Trotter, Esq., Leith Vale, Ockley, Surrey, for identification was submitted to the Scientific Committee.

Awards Recommended :

First-class Certificate.

To *Narcissus* 'Goldcourt,' as a show flower (voting unanimous). This refined, yellow Trumpet variety (Division 1a) received an **A.M.** on April 16, 1946. See JOURNAL, **71**, p. 205. Raised and shown by Mr. J. L. Richardson, Prospect House, Waterford.

Award of Merit.

To *Narcissus* 'Mahmoud,' as a show flower (voting unanimous). Raised and shown by Mr. J. L. Richardson.

To *Narcissus* 'Bizerta,' as a show flower (voting unanimous). Raised and shown by Mr. J. L. Richardson.

To *Narcissus* 'Crock of Gold,' as a show flower (votes 6 for, 0 against). Raised and shown by Mr. Guy L. Wilson, Broughshane, Co. Antrim.

To *Narcissus* 'Parkmore,' as a show flower (voting unanimous). Raised by Mr. Guy L. Wilson and shown by Mr. W. J. Dunlop, Dunrobin, Ballymena, N. Ireland.

Preliminary Commendation.

To *Narcissus* 'Amberley' (Division 2a), shown by Colonel F. C. Stern, F.L.S., V.M.H., Highdown, Goring-by-Sea.

To *Narcissus* 'Milanion' (Division 1a) shown by Mr. Guy L. Wilson.

Gold Medal.

To Mr. J. L. Richardson, for an exhibit of Daffodils.

Silver-gilt Flora Medal.

To Mr. W. J. Dunlop for an exhibit of Daffodils.

Silver-gilt Banksian Medal.

To Mr. Guy L. Wilson, for an exhibit of Daffodils.

Silver Flora Medal.

To Messrs. Barr & Sons, 11/13 King Street, Covent Garden, W.C. 2, for an exhibit of Daffodils.

To The Trenoweth Valley Flower Farm, St. Keverne, Cornwall, for an exhibit of Daffodils.

To Mr. R. Perks, Berrow Manor, Berrow, Somerset, for an exhibit of Daffodils.

Silver Banksian Medal.

To The Slieve Donard Nursery Co., Newcastle, County Down, for an exhibit of Daffodils.

To Mr. M. Wiseman, Seven Hills House, Seven Hills Road, Walton-on-Thames, for an exhibit of Daffodils.

Flora Medal.

To Messrs. R. H. Bath, Ltd., The Floral Farms, Wisbech, for an exhibit of Daffodils.

To Major J. O. Sherrard, The Old Rectory, Shaw, Newbury, for an exhibit of Daffodils.

Banksian Medal.

To F. E. Gibbs, Esq., Little Dawley, Hayes, Middlx., for an exhibit of Daffodils.

To Messrs. Partridge & Lower, Eastdon House, Starcross, Devon, for an exhibit of Daffodils.

To Mr. M. P. Kooper, Muirfield, Ferndown, Dorset, for an exhibit of Daffodils.

Other Exhibits.

Narcissus 'Nairobi,' shown by Mr. J. L. Richardson.

Narcissus 'Bann,' shown by Mr. Guy L. Wilson.

Narcissus 'Kanchenjunga,' shown by Mr. W. J. Dunlop.

Narcissus 'Cricket,' shown by C. R. Wootton, Esq., 119 Lichfield Road, Bloxwich, Walsall.

Varieties Selected for Trial.

The following Narcissi were selected for trial at Wisley as varieties for garden decoration :—

'Angmering' and 'Patching,' shown by Colonel F. C. Stern.

'Rouge,' shown by Mr. Guy L. Wilson.

RHODODENDRON COMMITTEE.—Mr. J. B. STEVENSON, V.M.H., in the Chair, and eighteen other members present.

Awards Recommended :

Award of Merit.

To *Rhododendron* × *Yeoman* (R. Choremia ♀ × R. repens) as a hardy flowering shrub (votes unanimous), from Lord Aberconway, C.B.E., V.M.H., Bodnant, N. Wales

To *Rhododendron inaequale* as a tender flowering shrub (hardiness not tested), (votes 10 for, 1 against), from Lord Aberconway, C B E , V.M H., Bodnant, N. Wales.

To *Rhododendron* × *Capt. Blood* (R. Wilhelmina ♀ × Griersonianum), as a hardy flowering shrub (votes 9 for, 1 against), from Capt C. Ingram, The Grange, Benenden, Cranbrook, Kent.

To *Rhododendron Cremorne* variety (to be named), as a hardy flowering shrub (votes 8 for, 3 against), from the Rt. Hon. Lord Swaythling, Townhill Park, West End, Southampton.

Other Exhibits.

Rhododendron hippophaeoides pink form, R. ' — Marchand,' (moupinense × shirabile), from Capt C. Ingram, The Grange, Benenden, Cranbrook, Kent.

R bullatum shown as *R. seinghkuense*, from Capt. Murray Adams-Acton, 37, Palace Gate, Kensington, W 8.

R. Macabeanum from Admiral A. Walker-Heneage-Vivian, C.B , M.V O , D.L , Clyne Castle, Blackpill, Swansea, Glamorgan. This species received a F C.C. in 1938.

JOINT ROCK-GARDEN PLANT COMMITTEE.—Col. F. C. STERN, O.B.E., M.C., F.L.S., V.M.H , in the Chair, and seven other members present.

Awards Recommended :

Award of Merit.

To *Aquilegia akitensis* var. *kurilensis* as a flowering plant for the rock-garden or alpine house (votes 6 for, 1 against), from Messrs. W. E. Th. Ingwersen, Ltd., Birch Farm Nurseries, East Grinstead, Sussex.

Cultural Commendation.

To G. H Berry, Esq , " The Highlands," Ridgeway, Enfield, Middlx., for extremely well grown pans of *Lewisia Tweedyi* and *Androsace imbricata.*

Other Exhibits.

Primula auricula var *decora* (shown as *Primula decora*), from Dr. M. Amsler, Delmonden Manor, Hawkhurst, Kent.

Primula auricula var. *Celtic King*, from Messrs. W. E. Th. Ingwersen, Ltd., Birch Farm Nurseries, East Grinstead, Sussex.

May 20, 1947.

FRUIT AND VEGETABLE COMMITTEE.—Mr. F. A. SECRETT, V.M.H., in the Chair, and thirty other members present.

Selected for trial at Wisley.

Asparagus ' K.B.F. Strain,' from Mr. A. W. Kidner, Bedford Farm, Lakenheath, Suffolk (West).

Seedling Apple, from J. F. Wastie, Esq., Eynsham, Oxford.

Other Exhibits.

Apples ' Corry's Wonder ' and ' Quince Aroma,' from J. F. Wastie, Esq., Eynsham, Oxford.

FLORAL COMMITTEE A.—Mr. W. R. OLDHAM, V.H.M., in the Chair, and nineteen other members present.

Awards Recommended :

First-class Certificate.

To Begonia ' Délice ' (votes 19 for, 0 against), from Messrs. Blackmore & Langdon, Bath.

Award of Merit.

To Begonia ' Jasmine ' (votes 19 for, 0 against), from Messrs. Blackmore & Langdon, Bath.

To Begonia ' Rhapsody ' (votes 19 for, 0 against), from Messrs. Blackmore & Langdon, Bath.

Preliminary Commendation.

To Bluebell ' Bartlett's Pink,' exhibited by B. Bartlett, Esq., St. Martin, Guernsey.

Cultural Commendation.

To Messrs. Blackmore & Langdon, Bath, for superbly grown plants of Begonias, 'Délice,' 'Jasmine' and 'Rhapsody.'

Selected for trial at Wisley.

Aquilegia 'Loddon Columbine' from Messrs. Thomas Carlile (Loddon Nurseries), Ltd., Twyford, Berks.

Other Exhibits.

Polyanthus seedling from Mr. S. O. Dolby, Horninghold, nr. Market Harboro, Leics.

Rose 'Fantasia' (to be seen again), from Messrs. Alex. Dickson & Sons, Ltd., Newtownards, nr. Belfast.

Viola 'Iden Queen' (to be seen again), from Iden Nurseries, Staplehurst, Kent.

FLORAL COMMITTEE B.—Lord ABERCONWAY, C.B.E., V.M.H., in the Chair, and twenty-nine other members present.

Awards Recommended :

Award of Merit.

To *Adenocarpus decorticans* as a hardy flowering shrub (votes 18 for, 0 against), from N. G. Hadden, Esq., West Porlock, Somerset.

To *Lilium Scottiae* hybrid as a hardy flowering plant (votes 18 for, 0 against), from Messrs. W. A. Constable, Ltd., Southborough, Kent.

To *Lonicera tatarica sibirica* as a hardy flowering shrub (votes unanimous), from Mr. W. J. Marchant, Wimborne.

To *Rehderodendron macrocarpum* as a hardy flowering shrub (votes unanimous), from G. H. Johnstone, Esq., Grampound Road, Cornwall.

To *Rubus trilobus* (Balls 4344) as a hardy flowering shrub (votes unanimous), from Capt. Collingwood Ingram, Benenden, Kent.

To *Smilacina racemosa* as a hardy herbaceous flowering plant (votes unanimous), from W. Bentley, Esq., Quarry Wood, Newbury.

Botanical Certificate.

To *Sargentodoxa cuneata* as a hardy flowering shrub (votes unanimous), from Sir Henry Price, Wakehurst Place, Ardingly.

Other Exhibits.

Berberis × 'Concalliantha,' *Staphylea Coulombieri grandiflora*, from Capt. C. Ingram, Benenden.

Berberis Thunbergii erecta, from Messrs. Hewitt & Co., Stratford-on-Avon.

Clematis alpina, *Menziesia lasiophylla*, *Pittosporum patulum*, from Mr. W. J. Marchant, Wimborne.

Davidia involucrata, from Sir Henry Price, Ardingly.

Eremurus spectabilis, from Col. F. C. Stern, O.B.E., M.C., Goring-by-Sea.

Hieracium Waldsteinii, *Primula Sieboldii* 'Perfield Gem,' from Messrs. A. R. and K. M. Goodwin, Bewdley.

Lilium 'Dunkirk,' *L.* 'Muriel Condie,' *L.* 'Scotsman,' *L.* 'Violet M. Constable,' from Messrs. W. A. Constable, Ltd., Southborough.

Magnolia sinensis, from Major E. de Rothschild, Exbury, Southampton.

Pentapterygium rugosum × *serpens*, from Miss G. M. Talbot, Penzance.

Primula 'Thorpe Morieux Hybrid,' from J. Strangman, Esq., Bury St. Edmunds.

Prunus serrulata 'Minterne,' from Lord Digby, Dorchester.

ORCHID COMMITTEE.—Mr. GURNEY WILSON, F.L.S., V.M.H., in the Chair, and sixteen other members present.

Awards Recommneded :

Silver Lindley Medal.

To W. H. B. Schroder, Esq., Dell Park, Englefield Green, for four superb examples of *Laeliocattleya* 'Anaconda,' bearing a total of twenty-six large flowers.

First-class Certificate.

To *Odontonia* 'Amphia' var. 'Vanguard' (*Odontoglossum* 'Clonius' × *Odontonia* 'Duchess of York') (votes 13 for, 2 against), from Messrs. Sanders, St. Albans.

Award of Merit.

To *Laeliocattleya* 'Jervis Bay' var. 'Our King' (*Lc.* 'Crowborough' × *Lc.* 'Windermere') (votes 12 for, 1 against), from Lt.-Col. F. E. Griggs, The Spinney, Chislehurst.

To *Odontioda* 'Dovedale' (*Oda.* 'Dovere' × *Odm.* 'Sheila Stephenson' (votes 12 for, 2 against), from McBean's Orchids, Ltd., Cooksbridge.

EXTRACTS FROM THE PROCEEDINGS
OF THE
ROYAL HORTICULTURAL SOCIETY

MAY 20, 1947

NARCISSUS AND TULIP COMMITTEE.—Mr. E. A. Bowles, F.L.S., F.R.E.S., V.M.H., in the Chair, and thirteen other members present.

Awards Reccommended :

Award of Merit.

To *Narcissus* ' Frigid ' as a variety for exhibition (votes 7 for, 0 against). Raised by Mr. Guy L. Wilson and shown by Mr. J. L Richardson, Prospect House, Waterford. (See p. 405)

To Tulip ' Smiling Queen,' as a variety for garden decoration (votes 6 for, 3 against). Raised by N. Roozen, Heemstede, Holland and shown by Messrs. Walter Blom and Son, Ltd., Coombelands Nurseries, Leavesden, Watford, Herts. (See p. 408.)

To *Tulipa linifolia* as a plant for the rock garden (votes 9 for, 0 against). Shown by Messrs. R. Wallace & Co., The Old Gardens, Tunbridge Wells (See p. 409.)

Preliminary Commendation.

To Tulip ' Sweet Harmony,' shown by Messrs. Walter Blom & Son, Ltd.

To Tulip ' Papago,' shown by Messrs. Walter Blom & Son, Ltd.

Other Exhibits.

Tulips ' Black Parrot,' ' Orange Parrot,' ' Sunshine,' ' Firebird ' and ' Gadelan,' shown by Messrs. Walter, Blom & Son, Ltd.

RHODODENDRON COMMITTEE.—Mr. J. B. Stevenson, V M.H., in the Chair, and eighteen other members present.

Awards Recommended :

First Class Certificate.

To × *Rhododendron* ' Lady Chamberlain ' var. ' Golden Queen,' (*R cinnabarinum* var. *Roylei* × *R.* ' Royal Flush ' ♀) (votes 12 for, 3 against) as a hardy flowering shrub from Maj. E. de Rothschild, Exbury House, Southampton

To *Rhododendron yakusimanum* (votes 13 for, 0 against) as a hardy flowering shrub, from the Director, R H S. Gardens, Wisley.

Award of Merit.

To × *Rhododendron* ' Tortoiseshell ' var. ' Wonder ' (× *R.* ' Goldsworth Orange ' × *R. Griersonianum* ♀) (votes 13 for, 0 against) as a hardy flowering shrub from Messrs. W. C. Slocock, Woking, Surrey.

To × *Rhododendron* ' Kharkov ' (*R Griersonianum* × *R.* ' Red Admiral ' ♀ (votes 16 for, 0 against) as a hardy flowering shrub from Maj. E. de Rothschild, Exbury House, Southampton.

To × *Rhododendron* ' Icarus ' (*R* (Azalea) ' Gilbert ' × *R. herpesticum* ♀) (votes 10 for, 5 against) as a hardy flowering shrub, from Maj E. de Rothschild

To × *Rhododendron* ' Icarus ' var. ' Organdie ' (*R.* ' Gilbert ' × *R. herpesticum*) (votes 14 for, 3 against) as a hardy flowering shrub, from Maj E. de Rothschild

To × *Rhododendron* (Azalea) ' Cornish Glow ' (Lanarth hybrid × Lanarth hybrid) (votes 10 for, 4 against) as a hardy flowering plant from Col. E. H. W. Bolitho, D.S.O. Trengwainton, Heamoor S.O, Penzance, Cornwall.

Other Exhibits.

Rhododendron (Azalea) *roseum*, from Mr. W. J. Marchant, Keeper's Hill Nursery, Stapehill, Wimborne.

× *Rhododendron* ' Zuyder Zee ' var. ' Helen ' (*R.* ' Mrs Lindsay Smith ' × *R. campylocarpum* ♀).

× *Rhododendron* ' Goldfinch ' (*R.* ' Mrs. P. D. Williams ' × *R. astrocalyx* ♀) and × *R.* (Azalea) ' Lolanda ' (*R. mucronatum* var. *magnifica* × *R. Kaempferi* ♀), from Capt. C. Ingram, The Grange, Benenden, Cranbrook, Kent.

× *Rhododendron* ' Lady Berry ' (*R* ' Rosy Bell ' × ' Royal Flush ' ♀) (**A.M.** 1937) and × *R.* ' Jordan ' (*R. dichroanthum* × *R. Griffithianum* ♀), two forms exhibited, from Maj. E. de Rothschild, Exbury House, Southampton.

× *Rhododendron* ' Azor ' var. ' C. F. Wood ' (*R. Griersonianum* × *R. discolor*), from Mrs. Preston, Slaugham Park, Haywards Heath, Sussex.

× *Rhododendron* ' Victory ' (*R.* ' Tally-ho × ' Britannia ♀) and *R. Yunnanense* Rock 59585, from Lord Digby, Cerne Abbey, Dorchester.

× *Rhododendron* (' Queen of May ' × *R.* ' Pink Bell ') × *R. Griersonianum*) to be named, and × *R.* ' R. G. A. Sims' × *R. Loderi*) to be named, from the Rt. Hon. Lord Swaythling, Townhill Park, West End, Southampton.

JOINT PERPETUAL-FLOWERING CARNATION COMMITTEE.—Mr. G. MONRO, C.B.E., V.M.H., in the Chair, and eleven other members present.

Exhibits.

'Arthur Allwood,' 'Market Pink,' and 'Royal Fancy,' all shown by Messrs. Allwood Bros., Ltd., Wivelsfield Nurseries, Haywards Heath, Sussex.

JOINT DIANTHUS COMMITTEE.—Mr. G. MUNRO, C.B E., V.M.H., in the Chair, and seventeen other members present.

Selected for trial at Wisley.

'Crimson Circle,' shown by Messrs. T. Carlile, Ltd., Carlile's Corner, Twyford, Berks.

'Snow White,' and *Allwoodii* 'May,' shown by Messrs. Allwood Bros., Ltd., Wivelsfield Nurseries, Haywards Heath, Sussex.

Other Exhibits.

Allwoodii alpinus 'Apollo' and 'Elf' (growing in the trials at Wisley), shown by Messrs. Allwood Bros., Ltd., Haywards Heath, Sussex.

JOINT IRIS COMMITTEE.—Mr. G. L. PILKINGTON, in the Chair, and twelve other members present.

Selected for trial at Wisley.

'White Wedgwood,' shown by H. J. Randall, Esq., Sandilands, Brooklyn Road, Woking, Surrey.

'Priscilla,' shown by Orpington Nursery Co., Orpington, Kent.

Other Exhibits.

'Oncobreds,' shown by H. J. Randall, Esq , Woking, Surrey.

'Radiant' (growing at Wisley), 'Elmohr' (growing at Wisley), 'Gaynelle' and 'Red Gleam,' all shown by Orpington Nursery Co., Orpington, Kent.

JOINT ROCK-GARDEN PLANT COMMITTEE.—The Hon. DAVID BOWES-LYON in the Chair, and fourteen other members present

Awards Recommended :

Award of Merit.

To *Thymus integer* as a flowering plant for the alpine house or rock garden (votes unanimous)' from Mrs. C. B. Saunders, "Husseys," Green Street Green, Farnborough, Kent.

To *Erinus alpinus* var. 'Barbara Hammer' as a flowering plant for the alpine house or rock garden (votes 8 for, 1 against), from C. H. Hammer, Esq., Guestwick Lodge, Chelmsford.

Preliminary Commendation.

To × *Linum iberidifolium* × *flavum*, as a flowering plant for the rock garden or alpine house (votes 12 for, 0 against), from Messrs. W. E. Th. Ingwersen, Birch Farm Nurseries, Gravetye, Sussex.

To × *Lewisia* 'Trevosia' (*L. columbiana* × *Howelli*) as a flowering plant for the rock garden or alpine house (votes unanimous), from Dr. P. L. Guiseppi, Trevose, Felixstowe, and Messrs. W. E. Th. Ingwersen.

To *Veronica Pageana* as a flowering and foliage plant for the rock garden or alpine house (votes 8 for, 0 against), from Messrs. A. R. and K. M. Goodwin, Stocklands, Bewdley, Worcs.

Cultural Commendation.

To Mr. W. J. Marchant, Keepers Hill Nursery, Stapehill, Wimborne (votes unanimous), for a large and well grown plant of *Schizocodon soldanelloides* var. *alpina*.

Other Exhibits.

Sedum pilosum and *Phlox mesoleuca*, which received the **A.M.** in 1930, from John Burges, Esq., 87 Ethelbert Avenue, Southampton.

Cytisus aspalathoides, from Dr. P. L. Guiseppi, Trevose, Felixstowe, Suffolk.

Anacyclus maroccanus, from G. H. Hammer, Esq., Guestwick Lodge, Chelmsford.

Calceolaria crenatiflora, which received the **A.M.** in 1928, from Messrs. A. K. and K. M. Goodwin, Stocklands, Bewdley, Worcs.

Trochocarpa thymifolia var. *disticha* and *Polygala pauciflora* or *paucifolia*, from Mr. W. J. Marchant, Keepers Hill Nursery, Stapehill, Wimborne.

JUNE 3, 1947

SCIENTIFIC COMMITTEE.—Mr. E. A. Bowles, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and six other members present.

Spurless Aquilegias.—Mr. G. W. Robinson showed several spikes of flowers of the spurless form of *Aquilegia vulgaris*, at one time common under the name of Clematoquilla. The flowers were larger than those usually seen in the spurless plants that occasionally occur in gardens

Various Plants.—Mr Marsden-Jones showed a form of *Geranium pyrenaicum*, with rather small flowers, the common form near Potterne, Wilts, *Potentilla rupestris*, *Myosurus minimus*, *Ranunculus acris* with hermaphrodite flowers, a form with female flowers only, another with neuter flowers, and one with crimped leaves and male flowers which has proved to be recessive, *Geum rivale*, the hybrid *G. intermedium* × *G. rivale* which breeds more or less true and is now more common than *G. rivale*, *G. intermedium* and *G intermedium* × *G. urbanum*, with more open yellow flowers He also showed field beans with purple flowers, a character now almost fixed in a variety grown by him rendering roguing easy

Arisarum proboscideum with twin spadices—Mr Bowles showed a fasciated inflorescence of *Arisarum proboscideum* with two spadices

Cytisus scoparius Andreanus—Mr. Le Grice of North Walsham wrote concerning the occurrence of a plant of *Cytisus scoparius* with flowers showing the chocolate blotch characteristic of the variety *Andreanus*, on a heath away from houses. This form occurs here and there but whether as a result of crossing with the original *Andreanus* which is reported to have been found growing wild in Normandy (as seems probable since the intensity of the blotch varies in such wild plants) or as a new mutation is not quite certain

Branching inflorescence of Aloe variegata—Mr Malpress of The Parkway, Welwyn Garden City, sent a sketch of a branched inflorescence of *Aloe variegata* which has been produced in his garden, one branch, rather thicker than the other bore 40, the other 25 flowers.

FRUIT AND VEGETABLE COMMITTEE.—Mr F. A. Secrett, V.M.H, in the Chair, and ten other members present.

Exhibits.

Brassica perviridis (Spinach mustard), Turnip ' Shoigoin,' and Turnip ' Seven Tops,' from L. G. G. Warne, Esq, Botany Dept, University of Manchester, Manchester, 13.

FLORAL COMMITTEE A.—Mr. G W. Leak, V M H, in the Chair, and eleven other members present

Awards Recommended :

Silver-gilt Flora Medal

To Messrs John Waterer, Son & Crisp, Ltd., Twyford, for an exhibit of Irises.

Silver-gilt Lindley Medal

To Rev Canon Rollo Meyer, Little Gaddesden, for an exhibit of Irises.

Silver-gilt Banksian Medal

To Messrs. Allwood Bros, Ltd, Haywards Heath, for an exhibit of Carnations and Pinks.

To Messrs. Thomas Carlile, Ltd, Twyford, for an exhibit of herbaceous plants.

To Messrs. Dobbie & Co, Ltd., Edinburgh, for an exhibit of Sweet Peas.

Silver Flora Medal.

To the Astolat Co, Ltd, Guildford, for an exhibit of Irises.

To Messrs. R C. Notcutt, Ltd., Woodbridge, for an exhibit of Irises.

Silver Banksian Medal.

To the Award Nurseries, Farley Green, Guildford, for an exhibit of Irises.

To Orpington Nurseries Co, Ltd., Orpington, for an exhibit of Irises.

To Messrs. R. Wallace & Co., Tunbridge Wells, for an exhibit of Irises.

To Mr. G. G. Whitelegg, Chislehurst, for an exhibit of Irises

Flora Medal.

To Lindabruce Nurseries, Lancing, for an exhibit of Border Carnations and Pinks.

To Messrs. M. Pritchard & Sons, Ltd, Christchurch, for an exhibit of herbaceous plants.

Banksian Medal.

To Messrs. C. Gregory & Son., Ltd, Chilwell, for an exhibit of Roses.

To Messrs. Hale & May, Ltd., Cookham, for an exhibit of herbaceous plants.

To Messrs Wheatcroft Bros., Ltd., Nottingham, for an exhibit of Roses.

Other Exhibits.

Lupins, from Mr. H. Mynott, East Barnet.

Lychnis dioica plena 'Emneth' variety, from Messrs. E. C. Simmonds & Son, St. Albans.

Roses and Violas, from Mr. C. A. Jardine, Feltham.

Verbascum phoeniceum 'Mother of Pearl,' from Messrs. E. C. Simmonds & Son, St. Albans.

FLORAL COMMITTEE B.—Lord ABERCONWAY, C.B.E., V.M.H., in the Chair, and fifteen other members present.

Awards Recommended :

Silver Banksian Medal.

To Mr. K. W. Harle, Lower Basildon, for an exhibit of succulents.

Flora Medal.

To Messrs. Robinson, Eltham, for an exhibit of rock garden plants.

Banksian Medal.

To Messrs. Notcutt, Woodbridge, for an exhibit of hybrid Lilacs.

First-class Certificate.

To *Rhododendron* 'Angelo' (*Griffithianum* ♀ × *discolor*) as a hardy hybrid (votes unanimous), from Major E. de Rothschild, Exbury, Southampton. (See p. 406.)

To *Rhododendron* 'Kilimanjaro' ('Dusky Maid' ♀ × *Elliottii*) as a hardy hybrid (votes 6 for, 1 against), from Major E. de Rothschild. (See p. 408.)

Award of Merit.

To *Embothrium lanceolatum*, Ñorquinco form, as a hardy flowering tree (votes 11 for, 0 against), from Lord Aberconway, C.B.E., V.M.H., Bodnant (See p. 404.)

To *Lilium pyrenaicum* as a hardy flowering plant (votes 12 for, 0 against), from G. P. Baker, Esq., Sevenoaks. (See p. 404.)

To *Rhododendron* 'Blancmange' ('Godesberg' ♀ × *auriculatum*) as a hardy hybrid (votes 12 for, 0 against), from Major E. de Rothschild. (See p. 407.)

Other Exhibits.

Leucothoe Davisiae, from Major E. de Rothschild.

Neillia ribesioides, from C. J. H. Adie, Esq. Wentworth, Surrey

Primula 'Thorpe Morieux Hybrid,' from J. G. Strangman, Esq., Bury St. Edmunds.

Rhododendron 'Isabel,' *R. Maddenii* f. *calophyllum*, from Lord Aberconway, C.B.E., V.M.H., Bodnant.

Rhododendron 'Jutland,' from Major E. de Rothschild.

Rose 'La Follette,' *Watsonia stenosiphon*, from T. T. Barnard, Esq., Wareham.

JOINT DIANTHUS COMMITTEE.—Mr. G. MUNRO, C.B.E., V.M.H., and nine other members present.

Selected for trial at Wisley.

Allwoodii alpinus 'Wisp,' shown by Messrs. Allwood Bros., Ltd., Wivelsfield Nurseries, Haywards Heath, Sussex.

Other Exhibits.

Allwoodii alpinus 'Wink,' and *Allwoodii alpinus* 'Elf,' both growing in the trials at Wisley, from Messrs. Allwood, Bros., Ltd., Haywards Heath, Sussex.

JOINT IRIS COMMITTEE.—Col. F. C. STERN, F.L.S., V.M.H., in the Chair, and nine other members present.

Selected for trial at Wisley.

'Edward of Windsor,' shown by N. L. Cave, Esq., Summerlea, Sugden Road, Thames Ditton, Surrey.

'Tobacco Road,' shown by R. T. A. Green, Esq., 18, Semaphore Road, Guildford, Surrey.

'Nastia,' shown by Col. F. C. Stern, Highdown, Goring-by-Sea.

'Blue Rhythm,' 'Helen McGregor' and 'Garden Glory,' shown by H. J. Randall, Esq., Sandilands, Brooklyn Road, Woking, Surrey.

Other Exhibits.

Seedling CA/1, from N. L. Cave, Esq., Sugden Road, Thames Ditton.

'Bacchus' and Seedling No. 130, from Col. F. C. Stern, Goring-by-Sea.

'Lynn Langford,' 'Arab Chief,' and 'Blue Shimmer,' from H. J. Randall, Esq., Brooklyn Road, Woking, Surrey.

'A 1,' from Orpington Nursery Co., Orpington, Kent.

JOINT ROCK-GARDEN PLANT COMMITTEE.—Mr. E. A. Bowles, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and five other members present.

Exhibits.

Michella repens, *Heliosperma micrantha*, and *Chrysanthemum hispanicum radicans*, from Dr. P. L. Giuseppi, Trevose, Felixstowe.

JUNE 17, 1947

FRUIT AND VEGETABLE COMMITTEE.—Mr. A. Cheal in the Chair, and nine other members present.

Selected for trial.

Cherry 'Wils Frühe Herz Kirsche,' from Capt C. Ingram, Benenden, Kent.

Other Exhibits.

Rhubarb 'The Sutton,' from Chas. J. Howlett, Esq., The Yews, Earley, Reading.

Strawberry 'Auchencruive Climax,' from the National Fruit Trials, Wisley, Ripley, Surrey.

Strawberry 'Early Cambridge,' from C. J. Gleed, Esq., 78 St. Cross Road, Winchester.

Seedling Strawberry, from Capt. A. Maitland-Dougall, R.N., Lynwood, Woodham Lane, Woking, Surrey.

FLORAL COMMITTEE A.—Mr. G. W. Leak, V.M.H., in the Chair, and twelve other members present.

Awards Recommended :

Silver-gilt Banksian Medal.

To Messrs. J. P. de Goede, Sz, Breezand, Holland, for an exhibit of Dutch Irises.

To Messrs. Kelway & Son, Ltd., Langport, for an exhibit of Paeonies.

Silver Flora Medal.

To Messrs. Allwood Bros., Ltd Haywards Heath for an exhibit of Border Carnations and Pinks.

To Messrs. R. H. Bath, Ltd., Wisbech, for an exhibit of Paeonies

To Messrs. Blackmore & Langdon, Bath, for an exhibit of Delphiniums, Phloxes, and Gloxinias.

To Messrs. Thomas Carlisle, Ltd., Twyford, for an exhibit of herbaceous plants.

Flora Medal.

To Messrs. Allwood Bros., Ltd., Haywards Heath, for an exhibit of *Dianthus Allwoodii* and Pinks.

To Messrs. C. Gregory & Son, Ltd, Chilwell, for an exhibit of Roses.

To Messrs. M. P. Kooper & Son, Ferndown, for an exhibit of herbaceous plants.

To Suffolk Seed Stores, Ltd., Woodbridge, for an exhibit of herbaceous plants.

To Messrs. R. Wallace & Co., Tunbridge Wells, for an exhibit of Dutch Irises, Hemerocallis, etc.

To Messrs. Ed. Webb & Sons (Stourbridge), Ltd, Stourbridge, for an exhibit of *Primula obconica*, Godetias, Nicotianas and other annuals.

Banksian Medal.

To Mr. W. E. B. Archer & Daughter, Ltd., Sellindge, for an exhibit of Roses.

To Lindabruce Nurseries, Lancing, for an exhibit of Pinks.

Award of Merit.

To Rose 'Charles Gregory' (votes 10 for, 0 against), from Messrs. C. Gregory & Son, Ltd., Old Close Nurseries, Chilwell, Notts. (See p. 408.)

Other Exhibits.

Campanula persicifolia var. from Miss Maude French, Maidenhead.

Delphinium seedlings, from C. J. Howlett, Esq., Earley, Reading.

Lupin seedling, from H. W. Driffield, Esq, Tunbridge Wells.

Paeony seedling, from Mrs Helen Bailey, Barnes.

Rose 'Spitfire,' from Mr. W. E. B. Archer & Daughter, Ltd., Sellinge. (Preliminary Commendation, July 2, 1946.)

FLORAL COMMITTEE B.—Lord Aberconway, C.B.E., V M.H., in the Chair, and twenty other members present.

Awards Recommended :

Gold Medal.

To Messrs. W. A. Constable, Ltd., Southborough, for an exhibit of Lilies.

Silver Banksian Medal.

To Messrs. L. R. Russell, Ltd., Windlesham, for an exhibit of greenhouse flowering plants.

To Messrs. Waterer, Sons & Crisp, Ltd., Twyford, for an exhibit of rock garden plants.

Flora Medal.

To Messrs. Burkwood & Skipwith, Ltd., Kingston-on-Thames, for an exhibit of flowering shrubs.

To Elstead Nurseries, Godalming, for an exhibit of rock garden and border plants.

To Mr. K. W. Harle, Lower Basildon, for an exhibit of succulents.

To Mr. W. Kibble, Bagshot, for an exhibit of rock garden plants.

Banksian Medal.

To Messrs. Feilden & Crouch, Wrotham, for an exhibit of rock garden plants.

To Orchard Neville Nurseries, Baltonsborough, for an exhibit of rock garden plants.

To Messrs. Robinson, Eltham, for an exhibit of rock garden plants.

Award of Merit.

To *Buddleia Colvilei* var. *kewensis* as a hardy flowering shrub (votes 13 for, 3 against), from Lord Aberconway, C.B.E., V.M.H., Bodnant, and Col. F. C. Stern, O.B.E., M.C., Highdown, Goring-by-Sea. (See p. 403.)

Preliminary Commendation.

To *Philadelphus* ' Unique ' as a hardy flowering shrub (votes 7 for, 3 against), from Messrs. S. Bide & Sons, Farnham.

Other Exhibits.

Albuca sp. (Milford 2057), from Mrs. Vera Higgins, Croydon.

Buddleia alternifolia, Hydrangea petiolaris, Oxypetalum caeruleum, from G. P. Baker, Esq., V.M.H., Sevenoaks.

Chaenomeles ' Clayden,' from Miss M. E. Clayden, Parkstone.

Clematis recta purpurea, from Miss M. French, Maidenhead.

Codonopsis clematidea, Phlomis Russellianus. from the Director, Royal Botanic Gardens, Kew.

Cytisus ' Sunrise,' from Bosley Farm Nursery, Christchurch

Diostea juncea, Mahonia japonica, from Lord Aberconway, C.B E., V.M H , Bodnant.

Lilium ' Brenda Watts,' from Iris Lady Lawrence, Albury, Surrey.

Schizophragma integrifolium, from Sir Henry Price, Ardingly.

Stachys grandiflora, from Mrs. Du Plat-Taylor, Kew.

RHODODENDRON COMMITTEE.—Mr. J. B. STEVENSON, V.M.H , in the Chair, and nine other members present.

Awards Recomended :

Award of Merit.

To × *Rhododendron* ' Jutland ' (*R.* ' Bellerophon ' × *Elliotii*) (votes unanimous), as a hardy flowering shrub, from Major E. de Rothschild, Exbury House, Southampton. (See p. 407)

Other Exhibits.

× *Rhododendron* ' Ophelia ' (*auriculatum* × *cyclium*).

× *Rhododendron* ' Indiana ' (*scyphocalyx* × ' Kyawi ').

× *Rhododendron* ' Gladys Rillstone ' (*discolor* hybrid).

× *Rhododendron* ' Opaline ' (*discolor* hybrid).

Rhododendron brevistylum (Rock 59204).

× *Rhododendron* ' Antonio ' (A.M.) var. ' Omega ' (' Gills Triumph ' × *discolor*).

All from Major E. de Rothschild, Exbury House, Southampton.

JOINT DIANTHUS COMMITTEE.—Mr. T. HAY, V.M.H., in the Chair, and seven other members present.

Selected for trial at Wisley.

Allwoodii ' Margaret,' *Allwoodii* ' Isobel ' and *Allwoodii* ' Eva,' all from Messrs. Allwood Bros. Ltd., Wivelsfield Nurseries, Haywards Heath, Sussex.

D. hybrida multiflora, from Mr. W. A. Hawkes, The Moat House, Howell, Hitchen, Herts.

Allwoodii ' Belinda,' from Mr. F. R. McQuown, 39 Farm Avenue, London, N.W. 2.

Other Exhibit.

' Lily Collins,' from Mr. A. Collins, 26 Leyland Avenue, St. Albans, Herts.

JOINT IRIS COMMITTEE.—Col. F. C. Stern, V.M.H., in the Chair, and twelve other members present.

Preliminary Commendation to :

Dutch Irises 'Mauve Queen,' 'Lemon Queen,' 'Blue Pearl,' 'Bronze Beauty' and 'Gold and Silver,' all shown by Messrs. J. P. de Goede, Breezand, Holland.

Selected for trial at Wisley.

Dutch Irises 'Mauve Queen,' 'Lemon Queen,' 'Blue Pearl,' 'Bronze Beauty,' 'Gold and Silver,' 'Le Mogol,' 'Saxe Blue' and 'Harmony,' all from Messrs. J. R. de Goede, Breezand, Holland.

Bearded Iris 'Mata Hari,' from Orpington Nursery Co., Orpington, Kent.

Other Exhibit.

Bearded Iris 'West Point,' from Orpington Nursery Co., Orpington, Kent.

JOINT ROCK-GARDEN PLANT COMMITTEE.—Col. F. C Stern, O.B.E., M.C., F.L.S., V.M.H., in the Chair, and five other members present.

Exhibit.

Campanula Kemulana from Mrs. C. B. Saunders, "Husseys," Green Street Green, Farnborough, Kent.

JUNE 24, 1947

JOINT DELPHINIUM COMMITTEE.—Mr. T. Hay, C.V.O., V.M.H., in the Chair, and nine other members present.

Award of Merit.

To 'Blackmore's Glorious,' as an exhibition variety (votes 9 for, 0 against), raised and shown by Messrs. Blackmore & Langdon, Bath. (See p. 403.)

Selected for trial at Wisley.

'Blackmore's Glorious,' from Messrs Blackmore & Langdon, Bath.

'Seedling A 2' (white-flowered), from Mrs. B. G. Wort, 18 Upper Woodcote Village, Purley, Surrey.

'Derek Hotblack' and 'Granville Bullmore,' from H S Hotblack, Esq., Deakes, Cuckfield, Sussex.

'Boningale Glory,' 'Harvest Moon,' 'Mary Denney,' 'Seedling' (to be renamed) and 'Madeleine,' all from Messrs. Baker, Codsall, nr. Wolverhampton.

Other Exhibits.

'Blackout,' from H. S. Hodson, Esq., 27 Daleham Gardens, Hampstead, London, N.W 3.

'Michael Blackmore' (selected for trial 1945) and 'Jennifer Langdon' (**A.M.** 1946), both from Messrs. Blackmore & Langdon, Bath.

JULY 1, 1947

SCIENTIFIC COMMITTEE.—Mr. E. A. Bowles, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and five other members present.

Albuca humilis.—Mrs. Higgins wrote that the Albuca shown at the last meeting was probably *A. humilis* or a variety of it, agreeing with the description in Flora Capensis and coming from a district in S. Africa in which Phillips records that it occurs.

Cherry with small fruits—Prof. Weiss showed shoots and fruits of a cherry from his garden which Dr. Turrill recognized as the bitter-fruited form of *Prunus Avium*.

Cytisus × *Adami.*—Mr. Tuckey of The Pond House, Duston, Northampton, sent a photograph of a fine tree of *C.* × *Adami* which grows in his garden Prof. Weiss said that in the course of some investigations on this tree he had struck cuttings taken in early spring and inserted outdoors in light soil; they had rooted by April or early May.

Conifers.—Commander Gilliland sent a cone of *Pinus excelsa* from a tree planted in his garden at Londonderry in 1932 and now 33 ft. high. It had not coned before. The young cones appeared in August 1946, then red and growing vertically (as shown by another specimen), now pendulous but still unripe; they show a distinctly pleasant pale purple colour He also sent an immature cone of *Sciadopitys verticillata* showing distinct emerald green scales, and foliage from a well-developed tree of this curious species from his garden.

Gladiolus Corms.—Mr. C. L. Piesse of Bassendean, Australia, sent a note on the production of Gladiolus corms on aerial portions of the plants. A neighbouring grower planting Iceland Poppies in hot weather shaded them by fans of foliage cut from Gladioli, close to the corm, as they were dug up. After about a month these shades were collected and it was found that about 25 per cent. of them had made an aerial corm ¼ to ⅛ inch in diameter. The foliage had soon become brown for the temperature ranged from 97° to 74° F. mostly in the upper part of the range. The soil, a sandy loam, had been watered by sprinklers.

FRUIT AND VEGETABLE COMMITTEE.—Mr. A. Cheal, in the Chair, and nine other members present.

Selected for trial.

Seedling Cherry, from H. A. Cole, Esq., 83 Wilton Road, Shirley, Southampton.

Other Exhibits.

Group of Seedling Strawberries, from Kingsley Fruit Farm, Kingsley, Bordon, Hants.

Strawberry Seedlings, Cambridge Nos. 260, 448, 454, 456, 475, 503, 504 and 558, from Kingsley Fruit Farm, Kingsley, Bordon, Hants.

Strawberries ' Icetone ' and ' Nell Gwynne,' from R. J. Wall, Esq., Bishop's Itchington, Leamington Spa.

Cherry Seedling, from D. W. F. Lamberth, Esq., 9 Richmond Road, Thornton Heath, Surrey.

Red Currants ' Red Lake ' and ' Laxton's No. 1,' from The National Fruit Trials, Wisley.

FLORAL COMMITTEE A.—Mr. G. W. Leak, V.M.H., in the Chair, and twelve other members present, with three members of the Joint Border Carnation and Picotee Committee in attendance.

Awards Recommended :

Silver-gilt Banksian Medal.

To Lindabruce Nurseries, Lancing, for an exhibit of Border Carnations.

Silver Lindley Medal.

To John Innes Horticultural Institution, Merton Park, for an exhibit of *Streptocarpus Dunnii* hybrids.

To H. R. H. Rickett, Esq., Pirbright, for an exhibit of Delphiniums.

Silver Flora Medal.

To Messrs. Allwood Bros., Ltd., Haywards Heath, for an exhibit of Carnations and Pinks.

To Messrs. Biddlecombe Bros., Bracknell, for an exhibit of Carnations.

To Messrs. T. Carlile Ltd., Twyford, for an exhibit of herbaceous plants.

To Messrs. Kelway & Son, Ltd., Langport, for an exhibit of Delphiniums.

To Messrs. Napier, Taunton, for an exhibit of Border Carnations.

To Messrs. John Waterer, Sons & Crisp, Ltd., Twyford, for an exhibit Irises, Astilbes, etc.

Floral Medal.

To Pillhead Flower Farm, Bideford, for an exhibit of Gerbera hybrids.

Banksian Medal.

To Award Nurseries, Farley Green, for an exhibit of *Iris Kaempferi*

To Messrs. Hale & May, Ltd., Cookham, for an exhibit of herbaceous plants.

To Messrs. Hale & May, Ltd., Cookham, for an exhibit of Roses.

To Mr. C. Newberry, Knebworth, for an exhibit of *Dianthus Winteri.*

Award of Merit.

To Border Carnation ' Frances Sellars,' as a variety for exhibition (votes 15 for, 0 against), from Lindabruce Nurseries, Lancing.

To Border Carnation ' Lancing Lady ' as a variety for exhibition (votes 15 for, 0 against), from Lindabruce Nurseries, Lancing.

To Rose ' Crimson Glow ' (votes 12 for, 0 against), from Mr. H. Robinson, Burbage, Hinckley.

To Rose ' Victoria ' (votes 12 for, 0 against), from Mr. H. Robinson, Burbage, Hinckley.

Selected for trial at Wisley.

Border Carnation ' Downs Apricot,' from Messrs. Allwood Bros., Ltd., Haywards Heath.

Border Carnation ' Downs Scarlet,' from Messrs. Allwood Bros., Ltd., Haywards Heath.

Chrysanthemum maximum ' Wirral Giant,' from Burleydam Nurseries (Chester) Ltd., Wirral.

Other Exhibits.

Chrysanthemum maximum ' Wirral Supreme,' from Burleydam Nurseries (Chester) Ltd., Wirral.

Campanula persicifolia ' Wirral Bell,' from Burleydam Nurseries (Chester) Ltd., Wirral.

Fuchsias, from C. J. Howlett, Esq., Earley, Reading.

FLORAL COMMITTEE B.—Lord Aberconway, C.B.E., V.M.H., in the Chair, and eighteen other members present.

Awards Recommended :

Gold Medal.

To Messrs. W. A. Constable, Ltd., Southborough, for an exhibit of Lilies and Alstroemerias.

Silver-gilt Flora Medal.

To Messrs. R. Wallace & Co, Tunbridge Wells, for an exhibit of Lilies, Eremurus and other hardy plants.

Silver Flora Medal.

To Messrs. L. R. Russell, Ltd., Windlesham, for an exhibit of Nymphaeas, Astilbes and other hardy plants.

Silver Banksian Medal.

To Mr. W. Kibble, Bagshot, for an exhibit of rock garden and border plants.

Flora Medal.

To Mr. K. W. Harle, Lower Basildon, for an exhibit of succulents.

To Messrs. Robinson, Eltham, for an exhibit of rock garden and border plants.

Banksian Medal.

To Mr. J. Klinkert, Richmond, for an exhibit of clipped Box trees.

To Mr. F. Street, Woking, for an exhibit of flowering shrubs.

Award of Merit

To *Philadelphus* ' Beauclerk ' as a hardy flowering shrub (votes unanimous), from the Hon. Lewis Palmer, Wonston, Sutton, Scotney.

Other Exhibits.

Daphne Mezereum alba ' Bowles's Variety,' from M. Ogilvie-Grant, Esq., Kew Green.

Philadelphus ' White Cockade,' from the Hon Lewis Palmer

Primula ' Berrywell,' from the Misses Logan Home, Coldingham.

Thalictrum Chelidonii, from W Bentley, Esq , Quarry Wood, Newbury.

JOINT DELPHINIUM COMMITTEE.—Mr. T. Hay, V.M.H., in the Chair, and seven other members present.

Award of Merit to :

' Jennifer Milligan,' as an exhibition variety (votes 6 for, 1 against), raised and shown by H. R. N. Richett, Esq., Ford's Farm, Pirbright, Surrey.

Selected for trial at Wisley.

' Jennifer Milligan,' from H. R. N Richett, Esq , Pirbright Surrey

' Seedling No. 5 ' (white flowered), from C. J. Howlett, Esq , 309 Wokingham Road, Earley, Reading.

' Delius ' and ' Cantata,' from Messrs. Hewitt & Co., Banbury Road, Stratford-on-Avon.

Other Exhibits.

' Seedlings Nos. 1, 6, 8, 14 and 18,' all from C. J. Howlett, Esq., Earley, Reading.

' Brigadier Hotblack ' (**A.M.** 1938), from H. S. Hotblack, Esq , Deakes, Cuckfield, Sussex.

' Sceptre,' from Messrs. Hewitt & Co., Stratford-on-Avon.

' Seedling,' from A. T. Knight, Esq , White Ness, West Clandon, Surrey.

JOINT DIANTHUS COMMITTEE.—Mr. George Monro, C B.E., in the Chair, and seven other members present.

Selected for trial at Wisley.

Allwoodii ' Edward,' from Messrs. Allwood Bros. Ltd., Wivelsfield Nurseries, Haywards Heath, Sussex.

Other Exhibits.

' Grace Harvey ' (dwarf double Sweet William), from Harold Harvey, Esq., 1 Glentworth Terrace, Lostwithiel, Cornwall

' Wirral Beauty ' and ' Wirral Fragrance,' from Burleydam Nurseries (Chester) Ltd., Little Sutton, Wirral, Cheshire.

JOINT IRIS COMMITTEE.—Mr. G. L. PILKINGTON in the Chair, and seven other members present.

Exhibits.

Iris Kaempferi ' Argus,' ' Hymen,' ' Adonis,' and ' Cassandra,' all from Messrs. John Waterer Sons & Crisp Ltd., The Floral Mile, Twyford, Berks.

JOINT ROCK-GARDEN PLANT COMMITTEE.—IRIS, Lady LAWRENCE, V.M.H., in the Chair, and six other members present.

Awards Recommended :

Award of Merit.

To × *Lewisia* ' Weeks's Seedling ' as a flowering plant for the Rock Garden or Alpine House (votes 5 for, 1 against), from A. G. Weeks, Esq., The Weald, Limpsfield, Common Surrey

To *Dianthus pindicola* as a flowering plant for the Rock Garden or Alpine House (votes unanimous), from Messrs. W. E. Th. Ingwersen, Birch Farm Nurseries, Gravetye, East Grinstead, Sussex.

Other Exhibits.

Campanula lasiocarpa, from Messrs. W. E. Th. Ingwersen, Birch Farm Nurseries, Gravetye, East Grinstead, Sussex.

JULY 15, 1947

SCIENTIFIC COMMITTEE.—Mr. E. A. BOWLES, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and seven other members present.

Many-petalled Cyclamen.—Prof. Weiss reported that he had further examined the flower of the Cyclamen shown at a previous meeting and found that the flower stalk showed an oval arrangement of about twenty-five vascular bundles, some of which were branching just below the flower, instead of the normal circular ring of ten vascular bundles. It looked therefore as though the multiple condition of the flower (with about twenty petals) was due to branching of the vascular system rather than to fasciation.

New Pest of Aquilegia.—Mr. G. Fox Wilson showed specimens of the sawfly *Pristiphora alnivora*, the larvæ of which had attacked Aquilegias in a garden in Hampstead in June. This is the first record of this insect in Britain, though it is known in North and Central Europe as a pest of Aquilegias. It has not been reported as feeding upon any other plant and is said to have four or five broods in the season in Germany.

Aquilegia vulgaris clematiflora.—Mr G. W. Robinson sent fruits of the plants he showed earlier in the year and pointed out that, with one exception, the plants had produced ten instead of five carpels to each flower.

Hosta plantaginea var.—Mr. W. T. Stearn showed foliage of two forms of *H. plantaginea* from Wisley, the one commonly grown under this name, which flowers freely, having leaves broader than long, the other, which he regarded as much less common, having leaves longer than broad and flowering much less freely. The latter appears to be the Japanese variety of the species (var. *japonica*), the former the variety grown in China.

Other plants.—Mr. Bowles showed on behalf of Major Pam leaves from two Pæonies growing in his garden apparently related to *P. Delavayi*. In one the leaf-segments were narrow and rather widely separated, in the other they were much closer and wider, so that the two had a very different appearance. Mr. Bowles also showed from his own garden a fine plant of the attractive *Veratrum album*, about five feet high, and the viviparous form of *Deschampsia caespitosa* with large panicles of small leafy shoots, each of which took the place of a flower.

FRUIT AND VEGETABLE COMMITTEE.—Mr. A. CHEAL in the Chair, and twenty-one other members present.

Selected for trial at Wisley.

Nectarberry, from Mr. G. Simpson, The Royal Gardens, Windsor, Berks.

Other Exhibits.

Group of Cucumbers grown under cloches, from Messrs. Chase, Chertsey, Surrey.

Group of Red, White, and Black Currants and Gooseberries, from the National Fruit Trials, Wisley.

Gooseberry ' Hodsdon's Early Market,' from J. Hodsdon, Esq., 22 Philip Ave., Rush Green, Romford, Essex.

Raspberry ' Malling G,' from Sir Reginald Rootes, Rumwood Court, Langley, nr. Maidstone, Kent.

FLORAL COMMITTEE A.—Mr. G. W. LEAK, V.M.H., in the Chair, and twelve other members present.

Awards Recommended :

Silver-gilt Flora Medal.

To Messrs. Blackmore & Langdon, Bath, for an exhibit of herbaceous plants.

Silver-gilt Banksian Medal.

To Messrs. S. McGredy & Son, Portadown, for an exhibit of Roses.

To Messrs. John Waterer, Sons & Crisp, Ltd , Twyford, for an exhibit of herbaceous plants.

Silver Flora Medal.

To Messrs. T Carlile, Ltd., Twyford, for an exhibit of herbaceous plants.

To Messrs. C. Gregory & Son, Ltd., Chilwell, for an exhibit of Roses.

Silver Banksian Medal.

To Messrs. Alex Dickson & Sons, Ltd., Newtownards, for an exhibit of Roses.

To Messrs. M. Prichard & Sons, Ltd , Christchurch, for an exhibit of herbaceous plants.

Flora Medal.

To Messrs. Wakeley Bros. & Co., Ltd , London, for an exhibit of Gladioli.

To Messrs A. Warner & Son, Boxted, for an exhibit of Roses.

Banksian Medal.

To Messrs. Hale & May, Ltd , Cookham, for an exhibit of herbaceous plants.

To Messrs. Hale & May, Ltd., Cookham, for an exhibit of Roses

To Messrs Kelway & Son, Ltd , Langport, for an exhibit of Ranunculus 'Kelways Improved Strain '

To Messrs. M. P. Kooper & Son, Ferndown, for an exhibit of herbaceous plants

To Messrs Napier, Taunton, for an exhibit of Border Carnations.

To Suffolk Seed Stores, Ltd , Woodbridge, for an exhibit of Delphinium 'Kingston Gem.'

To Messrs. Wheatcroft Bros., Nottingham, for an exhibit of Roses.

Award of Merit.

To Rose 'Fantasia' (votes 11 for, 0 against), from Messrs. Alex Dickson & Sons, Ltd., Hawlmark, Newtownards, nr. Belfast

To Rose 'Spek's Yellow' (votes 11 for, 0 against), from Mr. Jan Spek, Boskoop, Holland.

Cultural Commendation.

To C. J. Howlett, Esq., Earley, Reading, for plants of *Fuchsia fulgens* 'Lees' variety, one of which had been grown in the same pot for 20 years.

Other Exhibits.

Hippeastrum Hybrid, from the Director, R H S. Gardens, Wisley.
Rose 'Bridget,' from Messrs. R. Tucker & Sons, Faringdon, Berks.
Rose 'Glorious,' from Mr. H. Paige, Rotherfield, Sussex
Rose 'Poulsen's Bedder,' from Messrs. S. McGredy, & Son, Portadown.

ORCHID COMMITTEE.—Mr. GURNEY WILSON, F.L.S., V.M.H., in the Chair, and six other members present.

Awards Recommended :

Cultural Commendation.

To Ernest R. Ashton, Esq , Broadlands, Tunbridge Wells, for a large specimen of *Brassia verrucosa,* bearing eleven many-flowered racemes.

JOINT BORDER CARNATION AND PICOTEE COMMITTEE.—Mr. T. HAY, V.M.H., in the Chair, and nine other members present.

First Class Certificate.

To 'Eva Humphries,' as an exhibition variety (votes 9 for, 0 against), from J. H. Humphries, Esq., 47 Hardy Lane, Chorlton, Manchester (**A.M.** 1946).

Award of Merit.

To 'A. A. Sanders,' as an exhibition variety (votes 9 for, 0 against), from Mr. F. W. Goodfellow, Valley Nurseries, Aldridge, Staffs.

Selected for trial at Wisley.

'A. A. Sanders,' from Mr. F. W. Goodfellow, Aldridge, Staffs.

'Seedling,' from W. F. Moorby, Esq., Colesden Road, Chauston, Beds.

'Marjorie Hale,' from H. L. Hale, Esq., 41 Pinewood Avenue, Sidcup, Kent.

'Betty Prescott,' from Mr. G. E. Louis, Appley Nurseries, Ryde, I. of W.

'Downs Sunset,' from Messrs. Allwood Bros., Ltd., Wivelsfield Nurseries, Haywards Heath, Sussex.

Other Exhibits.

'Pamela Hale,' from H. L. Hale, Esq., 41 Pinewood Avenue, Sidcup, Kent.

'Southern Princess,' from F. J. Hayward, Esq., 43 Mill Road, Maldon, Essex.

'Christine,' 'Lena' and 'Eileen,' from H. Mynott, Esq., 12 Grange Avenue, East Barnet.

JOINT DELPHINIUM COMMITTEE.—Mr. T. HAY, V.M.H., in the Chair, and five other members present.

Selected for trial at Wisley.

'Kingston Gem,' from Suffolk Seed Stores, Woodbridge, Suffolk.

JULY 29, 1947

SCIENTIFIC COMMITTEE.—Mr. E. A. BOWLES, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and four other members present.

Gall on Erica carnea.—Mr. G. F. Wilson showed galls on *Erica carnea*, involving the apical part of the shoot which took the form of an ovate, congested growth, often preventing flowering. The gall was produced by the Cecidomyid fly, *Wachtliella ericina*, occurred in Birmingham in May 1947, and while apparently very rare in England, was known on the Continent.

Virescent flowers of Clematis, etc.—Miss E. S. Bedford again sent virescent flowers of Clematis from the same plant as last year. It appeared to be *C. florida plena*, which usually has a greenish tinge to the double white flowers. Miss Bedford also reported that the plant of Lupin, which had produced virescent flowers last year in her garden, was normal blue and white this year.

Rosa × cantabrigiensis.—Mr. Bowles showed fruiting shoots of this hybrid which apparently rarely fruits. They bore small scarlet globular fruits with a somewhat orange pedicel.

Plants referred to the Committee.—Plants referred to the Committee from Floral Committee B were identified as *Gloriosa Rothschildiana* and *Gentiana tibetica*, the latter a robust plant with ugly heads of whitish flowers and large leaves which ought to be avoided though sometimes offered.

Fasciated forms of Cryptomeria japonica.—Fasciated forms of *Cryptomeria japonica* were sent by Commander Gilliland under the names of *Lobbii nana* and *elegans nana*.

FRUIT AND VEGETABLE COMMITTEE.—Mr. A. CHEAL in the Chair, and eight other members present.

Award Recommended:

Silver-gilt Knightian Medal.

To the Governors of St. Andrew's Hospital, Northampton, for a group of vegetables.

Other Exhibits.

Raspberry seedling, from G. O. Bishop, Esq., 5 Hanbury Park Road, Worcester.

Peach seedling, from W. A. Stothard, Esq., 32 Lavington Road, Beddington, Croydon, Surrey.

ORCHID COMMITTEE.—Mr. GURNEY WILSON, F.L.S., V.M.H., in the Chair, and six other members present.

Award Recommended:

Award of Merit.

To *Laeliocattleya* 'Princess Ishtar' var. 'Mary' (*Lc.* 'Ishtar' × *Lc.* 'Princess Margaret'), (votes 6 for, 0 against), from Mr. Clint McDade, Rivermont, Tennessee, U.S.A.

EXTRACTS FROM THE PROCEEDINGS
OF THE
ROYAL HORTICULTURAL SOCIETY.

GENERAL MEETINGS

JULY 15, 1947

FLORAL COMMITTEE B.—Lord ABERCONWAY, C.B.E., V.M.H., in the Chair, and sixteen other members present.

Awards Recommended:

Silver Flora Medal.

To Messrs. L. R. Russell, Ltd., Windlesham, for an exhibit of Nymphaeas and other flowering plants.

Flora Medal.

To Mr. K. W. Harle, Lower Basildon, for an exhibit of succulents.

To Mr. W. Kibble, Bagshot, for an exhibit of rock garden and border plants.

Banksian Medal.

To Mr. J. J. Klinkert, Richmond, for an exhibit of clipped box trees.

Award of Merit.

To *Campanula lasiocarpa* as a hardy flowering plant for the rock garden (votes unanimous), from Dr. Walter Weir, The Barn House, Merstham.

Preliminary Commendation.

To *Lilium michiganense* as a hardy flowering plant (votes unanimous), from W. Bentley, Esq., Quarry Wood, Newbury.

Other Exhibits.

Nepeta Govaniana, *Senecio Doria*, exhibited by Messrs. M. Prichard & Sons, Ltd., Christchurch.

Rhododendron prunifolium × *occidentale*, exhibited by C. R. Anthony, Esq., Stoke Poges.

JULY 29, 1947.

FLORAL COMMITTEE A.—Mr. G. W. LEAK, V.M.H., in the Chair, and nine other members present.

Awards Recommended:

Silver-gilt Banksian Medal.

To Messrs. Blackmore & Langdon, Bath, for an exhibit of Phloxes.

To Messrs. S. McGredy & Son, Portadown, for an exhibit of Roses.

Silver Flora Medal.

To Messrs. T. Carlile, Ltd., Twyford, for an exhibit of herbaceous plants.

To Cobham Hall Estates Co., Cobham, Kent, for an exhibit of Monardas.

To Messrs. Kelway & Son, Ltd., Langport, for an exhibit of Gladioli.

To Messrs. John Waterer, Sons, & Crisp, Ltd., Twyford, for an exhibit of Phloxes.

Silver Banksian Medal.

To Messrs. Napier, Taunton, for an exhibit of Carnations.

To Messrs. Wakeley Bros. & Co., Ltd., London, for an exhibit of Gladioli.

Flora Medal.

To Messrs. Allwood Bros., Ltd., Haywards Heath, for an exhibit of Carnations and Dianthus.

To Messrs. De de Goede Bros., N.V., Beverwijk, Holland, for an exhibit of *Liatris callilepis*.

To Messrs. Hale & May, Ltd., Cookham, for an exhibit of herbaceous plants.

Banksian Medal.

To Fairview Nurseries, Hurst Green, for an exhibit of Roses.

Selected for trial at Wisley.

Fuchsia 'Countess of Aberdeen,' 'Coxeen,' 'Earl Beaconsfield,' 'Muriel,' 'Royal Purple,' from C. J. Howlett, Esq., Earley, Reading.

Other Exhibits.

Coreopsis 'Winifred Pigott,' from D. C. Pigott, Esq., Christchurch. (Selected 1946 for trial at Wisley.)

Roses and Violas, from C. A. Jardine, Esq., Feltham.

Solidago 'Goldenora' and 'Leonora,' from Miss A. Walkden, Sale.

FLORAL COMMITTEE B.—Lord ABERCONWAY, C.B.E., V.M.H., in the Chair, and sixteen other members present.

Awards Recommended :

Silver Flora Medal.

To Messrs. L. R. Russell, Ltd., Windlesham, for an exhibit of Nymphaeas.

Silver Banksian Medal.

To the Donard Nursery Co., Newcastle, Co. Down, for an exhibit of flowering shrubs and hardy plants.

Flora Medal.

To Mr. K. W. Harle, Lower Basildon, for an exhibit of succulents.

Banksian Medal.

To Mr. W. Kibble, Bagshot, for an exhibit of rock garden plants.

To Mr. J. Klinkert, Richmond, for an exhibit of clipped Box trees.

Award of Merit.

To *Lysimachia ephemerum* as a hardy herbaceous flowering plant (votes 8 for, 0 against), from H. Cornish Torbock, Esq., Crossrigg Hall, Penrith.

Other Exhibits.

Gentiana tibetica, Gloriosa Rothschildiana, exhibited by Dr. M. Amsler, Hawkhurst, Kent.

Hoheria populnea, exhibited by Col. F. C. Stern, O.B.E., M.C., Goring-by-Sea.

Liatris callilepis, exhibited by Messrs. de Goede Bros., Beverwyk, Holland.

Veratrum album, exhibited by E. A. Bowles, Esq., M.A , F.L.S., Enfield.

JOINT ROCK-GARDEN PLANT COMMITTEE.—Col F. C. STERN, O.B.E., M.C., F.L.S., V.M.H., in the Chair and seven other members present.

Awards Recommended :—

Cultural Commendation.

To Mr. A. H. Branch, gardener to Dr. A. Q. Wells, Shipton Manor, Shipton-on-Cherwell, Oxford, for a large and well-flowered pan of *Lysionotus pauciflorus* which received the Award of Merit in 1913.

Other Exhibits.

Gentiana cachemirica from Gilbert White, Esq., Chinthurst, Warboys Road, Kingston Hill, Surrey. (This plant received the Award of Merit in 1934)

AUGUST 12, 1947.

SCIENTIFIC COMMITTEE.—Mr. E. A. BOWLES, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and four other members present.

Agapanthus inflorescence proliferous. The Hon. Lewis Palmer showed a scape of *Agapanthus campanulatus* (commonly known as *A. Mooreanus*) from his garden with a secondary umbel arising from the middle of the primary umbel and with an incipient tertiary umbel similarly arising from that. An earlier specimen from the same plant showed a fasciated peduncle to the secondary umbel, the flowers of that umbel themselves being also fasciated.

Fruit of Koelreuteria paniculata.—Mr. Mackenzie showed panicles of the bladdery fruits of this tree from the old tree in the Chelsea Physic Garden. They form very conspicuous objects and increase the ornamental value of this tree, already high.

Distribution of seed of Allium Schuberti. Mr Stearn showed a fruiting umbel of *Allium Schuberti* which has pedicels of various lengths. When ripe in nature the umbel breaks off intact and is rolled by the wind over the steppes on which it grows, shedding the seed as it goes.

Albino form of Epipactis latifolia. Lady Lawrence sent a spike (one of two which she had found) of an albino form of *Epipactis latifolia* from Box Hill together with a normal spike of the species. The albino form was devoid of chlorophyll throughout leaf, stem and flowers and had a pinkish tinge. It had apparently been growing as a saprophyte and agreed well with a form mentioned in Col. Godfery's *British Orchidaceae* as having been found in Canada.

Green Rose. A fine example of this well-known aberration of *Rosa indica* came from Mrs. Wilmer's garden at Linwood, Ringwood. First noticed in Europe in 1859, it has been maintained in gardens "of the curious" ever since.

Aralia species. Mr. Haworth-Booth sent specimens from his garden at Black Down Hill, near Haslemere, of striking herbaceous Aralias which were identified as *A. californica* and *A. cordata* (sometimes grown under the synonym *A. edulis*, the "Udo" of Japan).

Chimera in Gladiolus Mr. Gould sent a Gladiolus with an albino stripe stretching from base to apex on one side of the plant, involving part of the stem and parts of the leaves on that side—an excellent and striking example of a chimera found in a cottage garden at Wisley

Various plants. Commander Gilliland sent fruiting shoots of *Dipteronia sinensis* from the tree planted in his garden at Brook Hall, Londonderry, about 1932. He also sent specimens of *Cryptomeria japonica elegans*, one from a tree about sixty years old which long since fell over on its side and now extends 38 feet from the original stem and is 33 feet wide, its various shoots reaching a height of 6 to 10 feet and forming a collection of bushy growths, some of which have rooted. The other is from a tree about twenty-six years old, growing at an angle of about 45°, now 19 feet high at a distance of 24 feet from its root. The specimens varied in shade according to their exposure to the sun

FRUIT AND VEGETABLE COMMITTEE.—Mr A Cheal, in the Chair, and nine other members present

Exhibits.

Group of Melons and Sweet Corn from Messrs. Chase & Co., Ltd, 12 The Grange, Chertsey, Surrey.

Black Currant 'Christine Dodson,' from Superintendent A C. Dodson, Lincolnshire Constabulary, Superintendent's Office, Divisional Headquarters, Stamford.

Seedling Apple, from A. E. Sadler, Esq. 22 Queens Avenue, Woodford Green, Essex.

Seedling Potato No 20, from Mrs M Asprey, Firs Lodge, Edenbridge, Kent

Seedling Plum, from F. D. Hopkins, Esq, 100 Chanctonbury Way, Woodside Park, N.12.

Apple 'Warrior,' from W. F. P Stockham, Rothesay, 211 Harefield Road, Uxbridge.

FLORAL COMMITTEE A.—Mr G. W Leak, V M H, in the Chair, and nine other members present.

Awards Recommended :

Gold Medal.

To Messrs. Konynenburg & Mark, Noordwyk, Holland, for an exhibit of Gladioli.

Silver-gilt Flora Medal.

To Messrs. Kelway & Son, Ltd, Langport, for an exhibit of Gladioli.

Silver Flora Medal.

To Messrs. Allwood Bros, Ltd, Haywards Heath, for an exhibit of Carnations and Dianthus.

To Messrs. T Carlile, Ltd, Twyford, for an exhibit of herbaceous plants.

To Mr. E. R. Lynas, Redcar, for an exhibit of Gladioli

To Messrs. Wakeley Bros. & Co., Ltd., London, for an exhibit of Gladioli.

To Messrs. John Waterer, Sons & Crisp, Ltd, Twyford, for an exhibit of herbaceous plants.

Silver Banksian Medal.

To Messrs. Hale & May, Ltd., Cookham, for an exhibit of herbaceous plants.

To M. Haworth-Booth, Esq, Haslemere, for an exhibit of Hydrangeas.

Flora Medal.

To Cobham Hall Estates Co., Cobham, Kent, for an exhibit of Monardas.

To Messrs. Wheatcroft Bros., Nottingham, for an exhibit of Roses.

Award of Merit.

To ***Hydrangea macrophylla*** var 'Générale Vicomtesse de Vibraye' (as a hardy flowering shrub (votes 9 for, 0 against), from G. H. Dowty, Esq. (gr. Mr. J. M. Grant), Grayswood Hill, Haslemere. (See p 455.)

Other Exhibits.

Gladioli, from H. A. Flint, Esq., Eltham.

Gladioli, from Mrs. H. W. Hall, Lymington, Hants.

Gloxinias, from E. M. Sangster Simmonds, Esq., Hindhead.

Roses 'Alain' and 'Michelle Meilland,' from Messrs. Wheatcroft Bros., Nottingham.
Solidagos 'Lemocreme,' 'Lennie,' 'Leon,' and 'Lesfield,' from Miss A. Walkden, Sale.

FLORAL COMMITTEE B.—Mr. E. A. Bowles, M.A., F.L.S., V.M.H., in the Chair, and eleven other members present.

Awards Recommended :

Flora Medal.

To Mr. K. W. Harle, Lower Basildon, for an exhibit of succulents.

Banksian Medal.

To Mr. J. Klinkert, Richmond, for an exhibit of clipped box trees.

Other Exhibits.

Crinum × *Powellii album*, *C.* × *Krelagei*, exhibited by C. R. Scrase-Dickins, Esq., Horsham.
Lilium × *Horsfordii*, exhibited by W. Bentley, Esq., Newbury.

JOINT DAHLIA COMMITTEE.—Mr. G. Monro, C.B.E., V.M.H., in the Chair, and ten other members present.

Selected for trial at Wisley.

'Bonanza,' 'Elsie Wilding,' 'Fireman,' 'Mat Tandy,' 'Mrs. Mays,' 'Roland,' from Messrs. James Stredwick & Son, St. Leonards-on-Sea.
'Cecile,' from Messrs. E. Cooper & Son, St. Albans.
'Vera Higgins,' from Mrs. Vera Higgins, Croydon.

To be seen again.

'Bonus,' 'Standard,' 'Sussex,' 'Whitegates,' from Messrs. J. Stredwick & Son, St. Leonards-on-Sea.
Dahlias were also submitted by F. E. Birch, Esq., Mitcham; C. Cooper, Esq., Sheffield; F. G. Pole, Esq., Merthyr Tydfil.

JOINT ROCK-GARDEN PLANT COMMITTEE.—Iris, Lady Lawrence, V.M.H., in the Chair, and five other members present.

Exhibit.

Campanula calaminthifolia var. *Olivieri*, from H. Clifford Crook, Esq., 4 Alexandra Crescent, Bromley, Kent.

AUGUST 26, 1947.

JOINT DAHLIA COMMITTEE.—Mr. G. Monro, C.B.E., V.M.H., in the Chair, and eight other members present.

Selected for trial at Wisley.

'Jescot Dula,' 'Jescot Jess,' 'Jescot Kenny,' from Messrs. E. Cooper & Son, St. Albans.
'Bonus,' 'Brown Bear,' 'F. E. Hopper,' 'Mary Ottley,' 'St. Bernard,' 'Whitegates' and two other varieties subject to renaming, from Messrs. J. Stredwick & Son, St. Leonards-on-Sea.

JOINT EARLY FLOWERING CHRYSANTHEMUM COMMITTEE.—Mr. E. F. Hawes in the Chair, and five other members present.

Award of Merit.

To 'Carol' as a variety for exhibition (votes 5 for, 0 against), shown by Messrs. J. & T. Johnson, Tibshelf, Derbyshire. (See p. 454.)
To 'Vanguard' as a variety for exhibition (votes 5 for, 0 against), shown by Messrs. J. & T. Johnson, Tibshelf, Derbyshire. (See p. 454.)
To 'Edensor' as a market variety (votes 5 for, 0 against), shown by Messrs. J. & T. Johnson, Tibshelf, Derbyshire. (See p. 454.)

Selected for trial at Wisley.

'Carol' and 'Vanguard,' from Messrs. J. & T. Johnson, Tibshelf, Derbyshire.

DEPUTATION TO SOUTHPORT SHOW

A deputation from the Council, consisting of Messrs A. Cheal, G. W. Leak, V.M.H., and W. R. Oldham, V.M H , with the Deputy Secretary in attendance, visited the Southport Show and made the following awards :--

Gold Medal.

To Messrs. Bees, Ltd., Chester, for a Mixed Group of Herbaceous Plants and Gladioli.

To Messrs. Bees, Ltd., Liverpool, for an Exhibit of a Garden.

To Messrs. Blackmore and Langdon, Bath, for a Mixed Group of Delphiniums, Begonias and Gloxinias.

To Messrs. Alex Dickson & Sons, Ltd., Newtownards, for an Exhibit of Roses

To Messrs. Dobbie & Co. Ltd , Edinburgh, for an Exhibit of Dahlias and Gladioli.

To Messrs. Henshall & Sons, Matlock Bath, for an Exhibit of a Rock Garden.

To the National Farmers' Union, for a Mixed Group of Vegetables, Fruit and Flowers.

To Messrs. S. McGredy & Son, Portadown, for an Exhibit of Roses

To Messrs. Sanders (St. Albans) Ltd , St Albans, for an Exhibit of Orchids.

To Messrs. Clarence Webb & Co , Kendal, for an Exhibit of Dahlias

To Messrs. E Webb & Son (Stourbridge) Ltd., Stourbridge, for a Mixed Group of Vegetables, Gladioli and other Flowers.

To Messrs. Toogood & Sons, Ltd , Southampton, for an Exhibit of Vegetables.

To Mr. William Robinson, Sunny Bank, Forton, nr. Preston, for an exhibit of Vegetables.

Silver-gilt Lindley Medal

To Messrs. G. Mair & Sons, Prestwich, for an Exhibit of Gladioli

To The Parks Dept , Southport Corporation, for Exhibits of *Acidanthera bicolor Murielae.*

Silver Lindley Medal

To Mr. William Robinson, Sunny Bank, Forton, nr Preston, for an Exhibit of Vegetables in Class 60.

Knightian Medal

To Mr. William Rimmer, 15, Cavendish Road, Birkdale, Southport, for an Exhibit of Tomatoes

To Mr. E. W. Roberts, Ye Old Machine, Ruthin, North Wales, for an Exhibit of Vegetables in Class 60.

SEPTEMBER 4, 1947.

JOINT DAHLIA COMMITTEE.—Mr. G Monro, C.B E., V.M H., in the Chair, and thirteen other members present

Selected for trial at Wisley.

' Elsje,' ' Josephine Klimpt,' ' Orange Nassau,' ' Vivianne Coppens ' from Messrs. Ballego & Son, Leiden, Holland.

' Susan Alesworth ' from Mr. A. T. Barnes, Bedford

' Hopeful,' ' Reedley,' ' Resplendant ' ' Roxhill,' ' Rhythm,' ' Speck,' ' Towneley Supreme,' ' Vicar,' from Mr. J. F. Barwise, Burnley.

' Morning Star ' from Messrs. Carter Page & Co. London

' P.M.' from Messrs. J. F. Spencer & Son Ltd , Hockley.

' Helen Stamford ' from Messrs. J. Stredwick & Son, St Leonards on Sea.

Dahlias were also submitted by Messrs. E. Cooper & Son, St Albans ; Mr. W. F. Harris, Cookham ; Mr O. Parratt, Farnham ; Messrs Ryder & Son (1920) Ltd., St. Albans ; Mr. W. J. Vernon, Caversham.

SEPTEMBER 9, 1947

SCIENTIFIC COMMITTEE.—Mr. E. A. Bowles, M.A., F L S., F.R E.S , V.M.H., in the Chair, and six other members present.

Wheat-Rye hybrid.—Mr. Marsden-Jones said that he had found the Wheat-Rye hybrid upon which he had previously commented sterile in the F_1 generation and back crosses made both ways had also failed, though this might possibly be due to the nature of the weather. He showed several ears of the hybrid badly attacked by Ergot.

Albino Epipactis.—A letter from Mr. Summerhayes was read referring to the specimen shown at the last meeting, in the course of which he said that both

Epipactis helleborine and *E. purpurata* are known to produce shoots lacking chlorophyll from plants bearing normal green shoots.

Fruit of Paeonia obovata.—Mr. Bowles showed fruit of a form of this Paeony known as var. *Willmottiae* with five well-developed follicles which had opened to show the deep blue seeds interspersed with the bright scarlet infertile ovules—forming a very picturesque object.

Second flowering of Cornus Nuttallii.—Mr. R. Glendenning of the Canadian Department of Agriculture, Agassiz, B.C., wrote that he had long noticed the summer flowering of *Cornus Nuttallii* and had watched the behaviour of four trees transplanted into his garden when about 5 feet high about twenty years ago. They grew rapidly and flowered every spring, but after a time "they started to flower a second time in August each year, *i.e.*, many of the bracts grew to some extent and whitened instead of remaining formed but dormant. This habit . . definitely spoils the blossom effect the succeeding spring: it is really not a second flowering, but a precocious development of a portion of next year's flower buds." Mr. Glendenning reports that one early autumn he noticed that trees "growing undisturbed amongst the usual dense brush that covers all the country at the Coast, were taking on their autumn red, and were thickly set with dormant buds and embryo bracts while any trees that had been included in land cleared for a garden or which had been transplanted to such a site were still green and sprinkled with the developed bracts." He thinks this may explain the second flowering to some extent, for such isolated trees would have a better water-supply in the dry months of July to September than would trees growing in close forest which would need to share it with their companions

SEPTEMBER 9, 1947

FRUIT AND VEGETABLE COMMITTEE.—Mr A. CHEAL in the Chair, and fourteen other members present.

Awards Recommended:

Silver-gilt Hogg Medal.

To His Grace the Duke of Rutland, Belvoir Castle, Grantham, for a collection of Plums.

Silver-gilt Knightian Medal

To His Grace the Duke of Rutland, Belvoir Castle, Grantham, for a group of Vegetables.

Silver Hogg Medal.

To the Governors of St. Andrews Hospital, Northampton, for a group of Melons.

To Messrs. Read & Co., Hockley, Essex, for a group of Grapes.

Selected for trial at Wisley.

'Read's Cordon Cucumber,' from Messrs. Read & Co., Hockley, Essex.

Other Exhibits.

Group of Fruit, from John Innes Horticultural Institute, Merton, Surrey

Plum 'Victory Victoria' and Apples 'Jennifer,' 'Peggy's Pride' and 'Green Howard,' from J. F. Wastie, Esq., Eynsham, Oxford.

Gage 'Elmgage,' from A. Elmer, Esq., 42 Ancaster Road, Beckenham, Kent.

Seedling Plum, from E. A. Kennard, Great Lodge Gardens, Tunbridge Wells.

Plum 'Invicta,' from C. E. Botwright, Ridley Villas, 56 Henniker Road, Ipswich, Suffolk.

American Plum, from Messrs. Cannell & Sons, Ltd., Loddon, Norfolk.

Peach, 'Suncroft,' from Mrs. E. L. Howells, Suncroft, 194 Kew Road, Richmond, Surrey.

Apple 'Stoke Pippin,' from Mr. J. A. Brown, The Nurseries, Higham Lane, Nuneaton.

Seedling Apple, from G. J. Packham, Esq., Heather Dean, Pounsley, Blackboys, Sussex.

Apple 'Wardington Seedling,' from Lady Wardington, The Manor House, Wardington, Surrey.

Apple 'Mitcham Wonder,' from C. H. Walkden, 8 Cecil Place, Mitcham, Surrey.

Unknown Apple, from C. Johnston, Esq., 4 Broomfield Road, Kew, Surrey.

Runner Bean 'Kingsbrook Monarch,' from A. T. Barnes, Esq., 13 Cardington Road, Bedford.

FLORAL COMMITTEE A.—Mr. G. W. Leak, V.M.H., in the Chair, and sixteen other members present.

Awards Recommended :

Gold Medal.

To Messrs Bees Ltd., Chester, for an exhibit of herbaceous plants.

To Messrs. Dobbie & Co., Ltd., Edinburgh, for an exhibit of Dahlias and Gladioli.

Silver-gilt Flora Medal

To Mr. Stuart Ogg, Swanley, for an exhibit of Dahlias

Silver-gilt Banksian Medal.

To Messrs. Brown & Such Ltd., Maidenhead for an exhibit of Dahlias.

To Messrs. J. F. Spencer & Son Ltd., Hockley, for an exhibit of Dahlias.

Silver Flora Medal.

To Messrs. Kelway & Son Ltd., Langport, for an exhibit of Gladioli.

To Mr. E. R. Lynas, Redcar, for an exhibit of Gladioli

To Messrs. S. McGredy & Son, Portadown, for an exhibit of Roses.

To St Andrew's Hospital, Northampton, for an exhibit of Coleus and Achimenes.

Flora Medal

To Messrs Allwood Bros Ltd., Haywards Heath, for an exhibit of Carnations and Dianthus.

To Messrs. T. Carlile Ltd., Twyford, for an exhibit of herbaceous plants.

To Mr. C. F. Lander, Bramhall, for an exhibit of Dahlias

Banksian Medal.

To Messrs. Hale & May Ltd., Cookham, for an exhibit of herbaceous plants

To Messrs. Hale & May Ltd., Cookham for an exhibit of Roses

To Messrs W. Pike & Son, Sutton-on-Trent for an exhibit of herbaceous plants.

To Messrs. Wheatcroft Bros Ltd., Nottingham, for an exhibit of Roses

Award of Merit.

To Rose 'Peace' (votes 16 for, 0 against) from Messrs Wheatcroft Bros Ltd., Ruddington.

Selected for trial at Wisley.

Solidago 'Leonard,' Solidago 'Lena,' and Solidago 'Lesden' from Miss A. Walkden, Sale.

Other Exhibits.

Coleus from Mr. A. Falconer, Stamford Park.

Rose 'Eternity' from Messrs Wheatcroft Bros Ltd., Nottingham.

FLORAL COMMITTEE B.—Mr. E. A. Bowles, M.A., F.L.S., in the Chair, and sixteen other members present.

Awards Recommended :

Silver Lindley Medal.

To Messrs. Perry, Enfield, for an exhibit of aquatics and moisture-loving plants.

Silver Banksian Medal.

To Lt.-Col. L. H. Brammall, Salisbury, for an exhibit of alpine plants

To Messrs. L. R. Russell, Ltd., Windlesham, for an exhibit of greenhouse plants.

Flora Medal.

To Messrs. Robinson, Eltham, for an exhibit of rock garden plants.

Banksian Medal.

To Mr. J. Klinkert, Richmond, for an exhibit of clipped box trees.

To Mr. F. Street, Woking, for an exhibit of hardy Heaths.

Award of Merit.

To ***Thalictrum diffusiflorum*** as a hardy herbaceous flowering plant (votes 14 for, 0 against), from W. Bentley, Esq., Quarry Wood, Burghclere, Newbury. This award was recommended on July 1, 1947, when the plant was exhibited as *T. Chelidonii.*

Cultural Commendation.

To Mr. Geo. Whitehead, gardener to the Hon Clive Pearson, Parham Park, Pulborough, for an exhibit of unusually fine specimens of *Lilium formosanum.*

Other Exhibits.

Orchagavia Lindleyana, Viburnum Davidii, V. koreanum, exhibited by Lord Aberconway, C.B.E., V.M H., Bodnant, N. Wales.

JOINT DAHLIA COMMITTEE.—Mr. G. Monro, C.B E , V M.H., in the Chair, and nine other members present.

Selected for trial at Wisley.

'Pretty Maid,' 'Tryst,' 'White Wings' from Mr A. T. Barnes, Bedford.

'Glacier,' 'Grebe,' 'Greta Woodhouse,' 'White Heart' from Messrs Brown & Such Ltd., Maidenhead.

Dahlias were also submitted by Mr. S. C. Dean, Warlingham.

JOINT ROCK-GARDEN PLANT COMMITTEE.—Iris, Lady Lawrence, V M.H., in the Chair, and six other members present.

Exhibits.

Amaracus Dictamnus, exhibited by Mr J. Burges, Bassett Green, Southampton.

Cyclamen near *C. cilicicum, Campanula* seedling, exhibited by Mrs. C B. Saunders, Green-Street-Green, Farnborough.

SEPTEMBER 16, 1947

JOINT EARLY-FLOWERING CHRYSANTHEMUM COMMITTEE.—Mr G W. Leak, V.M.H., in the Chair, and twelve other members present.

Awards Recommended :

Award of Merit.

To 'Salmon Una' (sport from 'Una'), as an exhibition variety (votes 12 for, 0 against), from Mr. G R. Bacon, Heathfield Nurseries, Bingley, Yorks.

To 'Autumn Glow' (votes 12 for, 0 against), as an exhibition variety, from Messrs. Johnson's (Florists), Ltd , Burton-on-Trent

To 'Red Caesar' (sport from 'Caesar'), as an exhibition variety (votes 8 for, 3 against) and 'Peach Una' (sport from 'Una'), as an exhibition variety (votes 9 for, 0 against), from Mr H. Woolman, Shirley, near Birmingham

To 'Gold of Ophir,' as an exhibition variety (votes 8 for, 4 against), from Mr. Ron Thisthethwaite, 83 Chesterfield Road, Barnet.

To 'Tempest,' as an exhibition variety (votes 12 for, 0 against), 'Mayford Orange,' as an exhibition variety (votes 12 for, 0 against), 'Typhoon,' as an exhibition variety (votes 12 for, 0 against), and 'Alpine,' as an exhibition variety (votes 12 for, 0 against), all raised and shown by Messrs H. Shoesmith, Ltd., Mayford, Woking, Surrey.

To 'Tibshelf Orange,' as an exhibition variety (votes 12 for, 0 against), raised and shown by Messrs. J. & T. Johnson, Tibshelf, Derbyshire

Selected for trial at Wisley.

'Salmon Una,' from Mr. G. R. Bacon, Bingley, Yorks.

'Autumn Glow' and 'Edith Gibbs,' from Messrs. Johnson's (Florists), Ltd , Burton-on-Trent.

'Red Caesar,' 'Peach Una' and 'Solidity,' from Mr. H. Woolman, Birmingham.

'Gold of Ophir,' from Mr. Ron Thisthethwaite, Barnet.

'Tempest,' 'Mayford Orange,' 'Typhoon,' and 'Alpine,' from Messrs. H. Shoesmith, Ltd., Woking.

'Tibshelf Orange,' from Messrs. J. & T. Johnson, Tibshelf, Derbys.

'Crimson Firedrake' (sport from 'Firedrake'), from Messrs. Napiers, Ltd., Stepwater Nurseries, Taunton, Somerset.

'Chas. E. Morris,' from Messrs. Wilson & Clark, Blenheim Nurseries, London, N.W. 2.

(*To be concluded*)

EXTRACTS FROM THE PROCEEDINGS
OF THE
ROYAL HORTICULTURAL SOCIETY

GENERAL MEETINGS

SEPTEMBER 16, 1947

JOINT EARLY FLOWERING CHRYSANTHEMUM COMMITTEE.—Continued from VOL. LXXII, page lxxxiv.

Other Exhibits.

'Henry Ivill' and 'New Countess' (to be seen again), from Mr. W. H. Harrison, Park Road Nursery, Winchester.

'Peakland Snow,' from Mr. E. Riley, Brookside Nurseries, Alfreton, Derbys.

'Rose Queen,' from Messrs. Johnson's (Florists), Ltd., Burton-on-Trent.

'Sunshine' (to be seen again), 'Primrose Barbara' (to be seen again), 'Rhapsody,' 'Mayford Pink' and 'Ina' (to be seen again), all from Messrs. H. Shoesmith, Ltd., Woking, Surrey.

To 'Pearl Sweetheart' (**A.M.** 1947), 'Picture' (to be seen again when renamed) and 'Astra' (to be renamed), all from Messrs. J. & T. Johnson, Tibshelf, Derbys.

'Springtime' (to be seen again), 'Patricia Wilson,' 'Royal Rose' and 'New Sanctuary,' all from Messrs Wilson & Clark, Blenheim Nurseries, London, N.W. 2.

SCIENTIFIC COMMITTEE.—Mr. E. A. BOWLES, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and seven other members present:

Ergot.—Mr. D. E. Green wrote that infection of the rye by the fungus Claviceps comes from sclerotinia (ergots) germinating in the soil, either fallen from wild grasses, or from a previous cereal crop. It is confined to the floral parts. The ascospores are wind borne and infect the young ovaries of open flowers the tissues of which are destroyed; as the sclerotium develops it replaces the grain, the shape of which it roughly resembles, its length depending upon the vigour of the host.

Barley crosses.—Mr. Marsden-Jones showed an interesting series of Barley crosses which he had made between lax and dense forms and six-rowed Barley. Promising forms combining good malting quality with a desirable habit had been produced.

Salvia microphylla.—Mr. Robinson showed examples illustrating the bright red to purplish-red varieties of *S. microphylla*, often called *S. Grahami* in gardens.

Various plants.—Mr. Bowles showed a Fuchsia seedling from Mme. Cornelisson having green foliage and semi-double purple flowers, fruits of *Solanum Torreyi* the largest of which appeared to contain perfect seeds, an unusual occurrence in his garden; a flowering spike of *Hesperaloe lineata* grown indoors.

Malformed fruit of Magnolia × *Veitchii.*—Mr. G. P. Baker sent a strongly curved fruit of *Magnolia* × *Veitchii.* Malformations of this type are not infrequent in fruits of Magnolia, usually resulting from the failure of some of the ovules to develop into seeds.

Seed of Magnolia Wilsonii was sent by Commander Gilliland from a tree in his garden now 17 feet high.

Bamboos.—Commander Gilliland also sent young canes of *Arundinaria Simoni* showing the purplish sheaths; young canes of the very vigorous *A. fastuosa* (up to 23 feet in his garden); and a young cane of *A. aristata* bruised and broken by wind blowing the hard mature canes against the soft, tender growths of the young ones in August, to be prevented only by roping round the clumps.

Female catkins of Populus Maximowiczii several inches long also from Brook Hall, the seed of which is reputed to be infertile, dehisced and showing very copious white down. This tree, planted in 1934, is now 60 feet high and exceeds *P. generosa* planted in 1919. Leaves of *P.* × *generosa* and of *P. robusta* were also sent to exhibit the great size attained by the foliage of these hybrids.

Queruis × *Schochiana.*—Commander Gilliland also sent foliage of this hybrid (*Q. palustris* × *Q. Phellos*) which lost its foliage last spring and shows considerable variety in the shape of the leaves. Foliage of *Q. Phellos* was sent for comparison.

INDEX

R.H.S. JOURNAL, VOL. LXXII

References in Clarendon type are to figures and illustrations

* Award given after trial at Wisley.
(a)—Azalea. (d)—Dutch. (e)—Early flowering.
(b)—Border. (p)—Perpetual-flowering.

Abelia × grandiflora, 295
  Schumannii, 295
Abeliophyllum distichum, 48, **100**, 110
Aberconway, Lord, on Ginkgo biloba, 32
Abercrombie, John (1726–1806), by F. M. G. Cardew, 245
Abies, 135, 139, 142, 143, 166, 175
  bracteata, 238
  cilicica, 487
  concolor var. candicans, 240
    var. Watterzii, 239, 240
  Fabri, xlix
  Forrestii, xlix
  grandis, 7
  Koreana, 240
  magnifica, 7
  nobilis, 7
  Nordmanniana, 7
  pectinata, 6
  recurvata, xlix
  Smithiana, 8
  Veitchii, 240
  Webbiana, 132
Abutilon, Boule de neige, 187
  megapotamicum, 259
  muticum, 103
  vitifolium, 26, 35, 189, 224
Acacia, 188
  acinacea, 229
  armata, 190
  Baileyana, 3, 224
  brachybotrya, 188, 236
  cultriformis, 229, 236
  dealbata, 47, 79, 189, 190, 225
  decurrens, 236
  diversifolia, 188
  Drummondii, 3
  Farnesiana, 101, 102
  floctonae, 224
  floribunda, 236
  grandis, 190
  juniperina, 229
  longifolia, 3, 189, 224, 227
  lophantha, 179, 180, 186, 187
  melanoxylon, 189, 190, 229
  pulchella, 236
  sp. 222
  verticillata, 229
Acantholimon glumaceum, 458
Acanthopanax ricinifolium, viii
  setchuenense, viii
Acer circinatum, 340
  dasycarpum, 109
  griseum, 381
  macrophyllum, 109
  Negundo, 109
  pennsylvanicum, 380
  saccharum, 109
Achillea clypeolata, 216
  Eupatorium, 260
Acidanthera bicolor var. Murielae, 341, lxxxi Silver Gilt Lindley Medal
Aciphylla latifolia, 191
Acokanthera venenata (Toxicophlaea spectabilis) 229
Adams, John, on The Gardener looks at his Flower Vases, 469
Adenocarpus decorticans, **A.M.** 1947, lxiv, 402
Adiantum, 25
  venustum, viii
Adoxa Moschatellina, 133
Aeonium, 236
  vanariensis, **234**
Aeschynanthus purpurascens, 34
Aesculus carnea var. Briottii, 108
  Memmingeri, 304
  sylvatica, 387
Agapanthus campanulatus, lxxviii
  inflorescence proliferous, lxxviii
Agathis australis, 238
Agave americana, 185, 187, **285**
  applanata, **357**, 372
  felifera, 187
  ferox, **357**
  Franzosinii, 230, **357**, 372
  Mortola Garden Hybrid, **357**
  sp. 222
Agaves at La Mortola, **357**, 372
Agonis marginata, 190, 228
Albuca humilis, lxxi
  sp. lxx
"All about House Plants," by Montague Free, reviewed, 411
Allium Schuberti, lxxviii
  spp., 70
  tricoccum, 36
  ursinum, 36
  Victorialis, 36
Aloe arborescens, 225
  chinensis, 187
  ciliaris, 187
  depressa, 187
  mitriformis, 186
  prolifera (brevifolia var. depressa), 186
  saponaria, 186, 187
  soccotrina, 184, 186, 187
  sp. 222
  spicata, 187
  variegata, lxvii
Alstroemeria Dover Orange, 260
Amaracus Dictamnus, lxxxiv
Amaryllis Belladonna, 380
  Belladonna var. rubra, 228
  procera, **F.C.C.** 1946, 39

Amsler, Dr. M., on Abeliophyllum, distichum, 100, 110
Amsonia ciliata, 387
  ciliata tenuifolia, 387
    tenuifolia alba White Cap, 387
  Tabernaemontana, 387
Anacyclus maroccanus, lxvi
Anchusa caespitosa, 16, 487
  italica, 16
  Morning Glory, 260
Andreas, Dr. C. H., on Embothrium coccineum Forster, 111
Andromeda japonica, 190
Androsace carnea var. exima, lviii
  imbricata, **A.M.** (Jenkin, 1930) as A. argentea, **56**, xxvi, 72, lviii, 373, lxxii, Cultural Commendation
  sp., **143**
Anemone Alice, 307
  apennina, 129
  Auréole, 307
  Autumn Queen, 307
  Beauté Parfaite, 307
  Brilliant, 307, **314**
  Buhler Kind, 307
  Calice Rose, 307
  Charmeuse, 307
  Collerette, 307
  coronaria, 70, 298
  Coupe d'Argent, 307
  Couronement, 307
  Diadème, 307
  elegans, 300, 301, 302, 303, 304, 305, 306, 307, 308, **314**
    Honorine Jobert, 302, 308, **314**
    var. tomentosa, 303
  Elegantissima, 307
  Enchantment, 307
  Enchantress, 307
  Géante des Blanches, 307
  Gracieuse, 307
  Herzblut, 307
  Honorine Jobert, 304, 305, 306, 308
  hupehensis, 262, 263, 264, 265, 266, **275**, 298, 299, 301, 302, 303, 307, 308
    var. japonica, 265, 266, 267, **275**, 298, 301, 300, 304, 305, 306, 307, 308, **314**
    praecox, 266
    splendens, 266
  hybrida, 305
  japonica, 261, 262, 263, 264, 265, 266, 267, 298, 299, 300, 301, 304, 305, 307, 308, 341, 458
    alba, 301, 304, 305, 306
    elegans, 305
    The history of, by E. A. Bowles and W. T. Stearn, Part I, 261, Part II, 297
    hupehensis, 263
    hybrida, 300, 303
    tomentosa, 303
  Joconde, 307
  Königen Charlotte (Queen Charlotte) 307, **314**
  Krimhilde, 307
  Lady Ardilaun, 306, 307, 308
Anemone Le Nain Rose, 307
  Lorelei, 307
  Luise Uhink, 307
  luzoniensis, 265
  Magenta, 307
  Margarete, 307
  Max Vogel, 307
  Mignon, 307
  Mont Rose, 307
  Nebuleuse, 307
  nemorosa, 129, 401
  nipponica, 263, 264, 265, 266, 298, 303, 307
  Prinz Heinrich, 307
  Profusion, 307
  Pulsatilla, 80
  Purpurine, 307
  Renoncule, 307
  Richard Ahrens, 307
  Rosace, 307
  Rose d'Automne, 307
  Rosea Superba, 307
  Schneekönigin (Snow Queen), 307
  speciosa, 303
  Stuttgardia, 307
  tomentosa, 263, 264, 265, 266, 298, 299, 303, 308
  Turban, 307
  Vase d'Argent, 307
  vitifolia, 265, 266, 298, 299, 300, 301, 302, 303, 304, 305, 307, 308, 314
    var. tomentosa, 265
  Whirlwind, 306, 314
Angraecum infundibulare St. Albans var., **A.M.** 1946, xxxi, 120
Anigozanthus, 235
  rufa, 186
Anley, G., on K. Wada San, 486
Annual General Meeting, 1946, xxxiv
Annual Report, 1946, xviii–xxvi
Anopterus glandulosus, 187, 227
Anthemis Loddon, **A.M.** 1946...39
  Sancti-Johannis, 260
  Thora Perry, 39
Antholyza paniculata, 231
  praealta, 188, 231
Antigonon leptopus, 25
Antirrhinum speciosum, 467
Anuraphis helichrysi, 369, 370, 460
Aphelenchoides ritzema-bosi, 364
Apicra deltoides, 187
Aponogeton distachyus, 188
Apple Allington Pippin, 54, 55
  American Mother, 76
  Appleby's Seedling, xlvi
  Bakers Delicious, i, Selected for tria
  Beauty of Bath, 49, 143, 482
  Belle de Boskoop, xxx
  Belvoir Castle, xlvi, liii
  Bramley's Seedling, 49, 50, 51, 52, 53, 54, 55, 56, 59, 76
  Cornish Gillyflower, 146
  Corry's Wonder, vi, lxiii
  Cox's Orange Pippin, 59, 146, 342, 347, 350, 475
  Cyril's Pride, xlvi
  Devonshire Quarrenden, 482

Apple Ellison's Orange, 347, 482
  Exquisite, 482
  Gascoyne's Scarlet, 76
  Golden Glow, xlvi
  Green Howard, lxxxii
  Highgate Pippin, i
  Illingworth Surprise, vii
  Jennifer, lxxxii
  Lady Sudely, 482
  Laxton's Superb, 49, 59, 76
  Lord Gladstone, 49
  Lord Hindlip, 350
  McIntosh Red, 347
  Mary Hamilton, xlvi
  Miller's Seedling, 482
  Mitcham Wonder, lxxxii
  Montfort, Selected for trial, lix
  Mother, 76
  Muriel, xxviii
  Nancy King, xlvi
  Newton Wonder, 49
  Owen Thomas, 482
  Oxford Pippin, xlvi
  Peggy's Pride, lxxxii
  Queen, 76
  Quince Aroma, lxiii
  St. Everard, 146
  seedling, Selected for Trial, lxii
  Shurlock's Pippin, xlvi
  Stoke Pippin, lxxxii
  Stokes Muston Marvel, i
  Tony's Wonder, xlvi
  Wardington Seedling, vii, lxxxii
  Warrior, lxxix
  Worcester Pearmain, 49, 146, 475
Apple and Pear, Intensive method of growing, by A. Beryl Beakbane, 145
Apples and Pears, When and how the amateur should pick and store, by Dr. Cyril West, 49
"Apples of England, The," by Dr. H. V. Taylor, reviewed, 76
Aquilegia akitensis var. kurilensis, **A.M.** 1947, lxiii, 402
  Loddon Columbine, Selected for trial, lxiv
  vulgaris, lxvii
    clematiflora, lxxiv
Aralia californica, lxxix
  cordata, lxxix
  edulis, lxxix
  sp., 222
Araucaria, 7
  Bidwillii, 234
  braziliensis, 30
  Cookii, 235
  Cunninghamii, 8
  excelsa, 30, 221, 229, 233
  imbricata, 30
Arbutus Andrachne, 32, 100, 468
  andrachnoides, 468
  Menziesii, 32, 33, 39, 159, 160, xlix
    Eley's Form, **F.C.C.** 23
    fructu coccineo, **F.C.C.** 1946...39, xxix
  Unedo, 468
Arctotis grandiflora, 185
Areca Baueri, 222, 232
Areca sapida, 222, 233
Arisarum proboscideum, lxvii
Artemisia, 172
  frigida, 389
Arthropodium cirrhatum, 186
Arum Dioscoridis, 70
  palaestinum, 70
Arundinaria aristata, lxxxv
  fastuosa, lxxxv
  Hookeriana, 22, 234
  Simoni, lxxxv
Asclepias tuberosa, 389
Asparagus acutifolius, 101
  K.B.F. strain, selected for trial, lxiii
Aspidium munitum, 11
Asplenium fontanum (Halleri), **A.M.** 1946...39
Aspodeline lutea, 191
Aster Albanian, v
  Amellus, 339
    seedling, 1/40, ii
  argophyllus (=Olearia argophylla), 185
  attacked by Plum Aphis, **357**
  Bishop, selected for trial, v
  Blandie, selected for trial, v
  Little Red Boy, selected for trial, ii
  Mighty Atom, ii
  Murrayii Wirral Queen, ii
  Ostrich Plume, 369
  Pappei, 227, 228
  Peace, selected for trial, v
  perennia, 364
  Plenty, selected for trial, v
  Prosperity, selected for trial, v
  Rosebud, selected for trial, v
  Seedling, selected for trial, v
  Seedlings, Injury to, by the Leaf Curling Plum Aphis (Anuraphis helichrysi) by I. Thomas, 369
  Sunset, ii
  The Archbishop, selected for trial, v
    Cardinal, selected for trial, v
    Dean, selected for trial, v
    Verger, selected for trial, v
  tibeticus, 140
Astericus maritumus, 230
Asystasia bella, 216
Athrotaxis cupressoides, 239
  selaginoides, 239
Atragene japonica, 263, 308
Aubergines, 96
Aulacorthum, solani, 370
Awards after trial at Wisley, 1946...251
Award of Garden Merit LXXIX, LXXX, 191, 399
Awards to plants in 1946...39, 75, 120, 160, 211
  1947...288, 373, 402, 454, 487
Awards to Sundries, 1946, xxxi

Babiana, 188
Baeckea sp., 222
  virgata, 229
Bagenal, N.B., on French Fruit Garden, 71
Balfour, A. P., on Charm Chrysanthemums, 17

Ballota, 231
Banksia grandis, 222, 234
  integrifolia, 222, 228
  littoralis, 186, 222, 232
  serrata, 187, 222, 225
Barosma, 228
  lanceolata, 416
Beakbane, A. Beryl, on Intensive methods of Apple and Pear growing, 145
Bean, Broad, Acme, 37
    Aquadulce, 36
    Bunyards Exhibition, 36
    Cobea, 37
    Conqueror, **A.M.*** 1946...37
    Dreadnought, 37
    Dwarf Fan, 36
    Early Mazagon, 36
    Express, **A.M.*** 1946...37
    Fillbasket, 37
    Giant Four-Seeded White Windsor 36
    Green Giant Longpod, 36
    King of Beans, 37
    Leviathan, 37
    Long Pod Improved, 37
    Peerless, 37
    Queen of Beans, 37
    Unrivalled Green Windsor, 36
  French, The Prince, 98
  Runner, Kelvedon Wonder, 98
    Kingsbrook Monarch, lxxxii
    Princeps, 98
    Prizewinner, 98
    Streamline, 98
Beans, Broad, at Wisley, 1946...36
  French, 96, 98
  Runner, 96, 98
Beech at Dawyck, 1946...22
Beetroot, 96, 98
  Cobham Early, 98
  Detroit Red Globe, 98
Begonia coccinea, 34
  Delice, **F.C.C.** 1947, Cultural Commendation, lxiii, lxiv, 402
  geraniifolia, 25
  Jasmine, **A.M.** 1947, Cultural Commendation, lxiii, lxiv, 402
  Rhapsody, **A.M.** 1947, Cultural Commendation, lxiii, lxiv, 402
Bellew, Col. F. D. Trollope on Magnolia Veitchii, 335
Berberis, 141, 171, 176
  × Concalliantha, lxiv
  congestifolia, 235
  Darwinii, 35
  dictyophylla, 417
  Gagnepainii, 107
  Jaeschkeana var. bimbilaica, 172 173
  Jamesiana, 381, 417
  kongboensis, 133
  koreana, 165, 381
  Ludlowi, 172, 173
  macrosepala, 136
  Prattii, xxix
  rubrostilla crawleyensis, vi
  stenophylla, 107, 165
Berberis Taylorii, 141
  Thunbergii atropurpurea, 107
    erecta, lxiv
  tsarica, 173
  Vernae, 165
  Wilsonae, 107, 381
  Wisley Hybrids, 381
  xanthoplaea, 176
Berneuxia thibetica, 172
Beschorneria yuccoides, 188, 229
Beschornerias, 182
Betula lutea, iv
Bifrenaria Harrisoniae, 87
  pubigera, 87
Bignonia, venusta, 28
Blasdale, Walter, C., on The Secretion of Farina by sp. of Primula, 240
Blennocampa pusilla, The leaf-rolling Rose sawfly, by G. Fox Wilson, 155
Bluebell Bartlett's Pink, **P.C.** lxiii
Blumea chiosquarrides, 103
Bomarea, 232
Book reviews, 44, 76, 124, 256, 291, 336, 375, 400, 456, 489
Brandt, Lester E., on Arbutus Menziesii in its native habitat, 159
Bouvardia, 306
Bowkeria serrulata, 234
Bowles, E. A., and W. T. Stearn, on The history of Anemone japonica, 261, 297
Boyko, Dr. Elisabeth, on Some Wild Plants of Palestine, 68
Bougainvillaea peruviana, 28
Brachychiton acerifolium, 373
Brachyglottis repanda, 224
Brachysema acuminatum, 187, 232
Bradford, S. C., on Some experiments with Hortomone A, 395
Brassia, brachiata, 87
  perviridis, lxvii
  verrucosa, 87, lxxv, Cultural Commendation
Brassolaeliocattleya Crusader var. Radiant, **F.C.C.** 1946, xxxi, 120
  × Dawn Angela var. Tennessee, **A.M.** 1946, vi, 40
  Nugget, **A.M.** 1947, 288, lvi
Bravoa geminiflora, 186
"British Herbs and Vegetables" by G. M. Taylor, reviewed, 412
Bruckenthalia spiculifolia, 216
Brunfelsia calycina, 373
Buddleia, 172, 176
  alternifolia, lxx, 428
  asiatica, 4
  caryopteridifolia, 432
  Colvillei, 28
    var. kewensis, **A.M.** 1944, lxx, 403
  Davidii, 297, 340, 435
    var. nanhoensis, 296
  Fallowiana, 340
  Farreri, 28, 427, 428, 430, 431, 432, 436, 437
  globosa, 26, 188, 297
  hastata, 428, 430
  heliophila, 428, 434, 435, 437

Buddleia incana, 28
Sterniana, 428, 432, 433, 437
tibetica, 427, 428, 429, 430, 432, 436, 437, **437**
variabilis, 28
× Weyeriana, viii, 297
Buddleias, The Spring-flowering, by A. D. Cotton, 427
Bulbophyllum Beccarii, 34
Bupleurum fruticosum, 226
Burkwood, A, on The Genus Viburum, 360
Bursaria spinosa, 231
Bush, Raymond, on Pitfalls of the Amateur Fruit Grower, 473
Butomus umbellatus, 260
Buxus, 176
Bud-variation, 306

" Cacti, The Study of " by Vera Higgins, reviewed, 211
Caesalpinia Gilliesii, 25
tinctoria, 25
Cahen, Edward, on Ginkgo biloba, 288
Calceolaria, 24
crenatiflora, lxvi
Pavonii, 3, 416, 417
violacea, 233
Calendula, 99
Callistachys ovata, 221
Callistemon, 188
liniaris, 187
salignus, 229
sp., 222
Callitris articulata, 239
Calluna vulgaris, iv, 260, 306, 417
„ vulgaris H. E. Beale, vi, 340
Calodendron capense, 234
Calothamnus, 188
Calycanthus, 387
Calycotome villosa, 100
Camellia cuspidata, 61, 67, 128, 212
hongkongensis, 67
japonica, 3, 47, 59, 60, 61, 63, 66, 68, 128, 163, 212, 421
× alba simplex, 61
var. Lady Clare, 421
magnoliaeflora at Wisley, **60**
Mikado, 47
var. White Swan, 3
J. C. Williams, 3, **60**, 61, 66
magnoliaeflora, 60
maliflora, 67, 212
× Mary Christian, 66
oleifolia, 60, 61, 63, 67
Pitardii, 65
propagation of, **60**
reticulata, **60**, 60, 61, 63, 65, 66, 212
St. Ewe, **A.M.** 1947...288, liv
saluenensis, 3, 60, 61, 63, 65, 66, 67, 212, 416
sasanqua, 63, 67, 212, 416
sinensis, 67, 212
speciosa, 65
taliensis, 60, 63, 66
" Camellias in America " by H. Harold Hume, reviewed, 212
Camellias and their culture, by Francis Hanger, 59
Cameron-Brown, C. A., on Electricity in the garden, 274
Campanula bellidifolia, 215
calaminthifolia var. Olivieri, lxxx
cashmiriana, iii
× Gremlin, **A.M.** 1946...40
× haylodgensis, 259
hercegovina var. nana, **A.M.** 1946, 40
Kemularia, lxxi
× kewensis, 215
lasiocarpa, **A.M.**, 259, lxxiv, lxxvii
persicifolia, lxix
Wirral Bell, lxxii
petrophila, 215
spathulata, 16
trichopoda, 14
× Tymonsii, 259
Campsis chinensis (Tecoma grandiflora), 295
(Tecoma) grandiflora, 341
Canarina campanulata, 3
Candollea cuneiformis, 188, 232
Canna indica, 283
Cantua buxifolia, 28, 185
dependens, 227
Capparis spinosa, 102
Caragana, 172
Cardew, F. M. G., on Dr. Thornton and the New Illustrations (1799–1807), 281
on John Abercrombie, (1726–1806), 245
on Dr. Thornton's Royal Botanical Lottery, 450
Carica papaya, 30
Carnation (b) A. A. Sanders, **A.M.** 1947, selected for trial, lxxv, lxxvi, 403
(b) Afton Water, 206
(b) Ailsa Clove, 207
(b) Alex Faulds, 206
(p) Arthur Allwood, lxvi
(b) Belle of Bookham, 206
(b) Betty Prescott, selected for trial, lxxvi
(b) Blanchefleur, **H.C.*** 1946...206
(b) Bookham Clove, 207
(b) Bookham Clove Improved, 206
(b) Bookham Favourite, 207
(b) Carnock Triumph, 207
(b) Catherine Glover, 207
(p) Cheshunt Pink, xxix
(p) Cheshunt Salmon, xxix
(b) Christine, lxxvi
(b) Cottage Claret, 206
(b) Cottage Gem, 206
(b) Cottage Jewel, 206
(b) Cottage Rose, 206
(b) Cottage Ruby, 206
(b) Cottage Wonder, 206
Crimson Clove, 20, 21
(b) David Douglas, 207
(b) Dora Spenlow, 206
Downs Apricot, selected for trial, lxxii

Carnation (b) Downs Scarlet, selected for trial, lxxii
(b) Downs Scarlet Sunset, selected for trial, lxxvi
(b) Edenside Pink, 206
(b) Edenside White, 206
Eileen, lxxvi
(b) Emma Kirkwood, 207
(b) Eva Humphries, **A.M.** 1946, **F.C.C.** 1947...40, 403, lxxv
(b) Evelyn Knapton, **F.C.C.** 1946...40
(b) Fascination, 207
Fenbow, 19
Nutmeg, **23**
Flame, 19
(p) Foam, xxix
(b) Fortrose, 206
(b) Frances Sellars, **A.M.** 1947, lxxii 403
(b) Ganymede, **A.M.*** 1946, 207
(b) Golden Dustman, 206
(p) Gracie Fields, xxix
(b) H. A. Knapton, **A.M.** 1946...40
(b) Harriet Harrow, 206
(b) Heron, 206
(b) Jean Frost, **A.M.** 1946...40
(b) Jean Milton, **A.M.** 1946...207
(b) Lancing Lady, **A.M.** 1947, lxxii, 403
(b) Lena, lxxvi
(b) Leslie Rennison, **H.C.** 1946...206
Lord Chatham, 21
(b) Lucy Bertham, **A.M.*** 1946...207
(p) Marian Allwood, **A.M.** 1946...41, xxix
(b) Majorie Hale, selected for trial, lxxvi
(p) Market Pink, xxix, lxvi
(b) Mary Carmichael, 207
(b) Mary Livingston, 206
(b) Mrs. A. Kemble, 206
(b) Mrs. J. J. Keen, 207
(b) Muriel Hawtin, 207
Painted Lady, 19, 20, 21, **23**
(b) Pamela Hale, lxxvi
(b) Patrick, **A.M.*** 1946...207
(b) Perfection, 207
Raby Castle, 21
(b) R. M. Grier, 207
(b) Robert Addison, 207
(b) Robin Thain, **F.C.C.*** 1946...207
(p) Royal Crimson, **A.M.** 1946, xxix, 41
(p) Royal Fancy, lxvi
(b) Seedling, selected for trial, lxxvi
(b) Silas Osbaldiston, 207
(p) Snowdrift, xxix
Sops-in-Wine, 21
(b) Southern Mist, 206
(b) Southern Princess, **A.M.** 1946. 41, lxxvi
(b) Spencer Davis, **A.M.** 1946...41
(b) Togo, 207
(b) W. B. Cranfield, 206
(p) Winston Churchill, xxix
Ye Gallant's Fayre Ladye, 20
"Carnations for Everyman," by Montagu E. Allwood, reviewed, 458
Carnations and Pinks, The Old, by Grace Gladwin, 19
Carnations (b) at Wisley, 1945-46...206
Carrot, 95, 97
Amsterdam Forcing, 97
Early Nantes, 97
Cassia corymbosa, 185, 234, 341, 381
stipulacea, 47
Cassiope fastigiata, 140, 173
lycopodioides, 128
pectinata, 140
rigida, Cultural Commendation, lviii
selaginoides, 173
var. nana, 137
tetragona, 128
Wardii, 137, 144, **186**
Catalpa bignonioides, 109, 260
Cattleya × Ann Sander, **A.M.** 1946...41
× Bow Bells var. Snow Queen, **A.M.** 1946...41, iii
citrina, 87
Enid var. Rivermont, **A.M.** 1947, xlviii, 288
Gloriette var. Rivermont, **A.M.** 1947, xlvi, 289
Ceanothus Gloire de Versailles, 107
rigidus, 163, 485
Cecropia peltata, 26
Cedrus atlantica glauca, 2, 239
Deodara, 8
Centaurea, 228
Centenary of three Introductions of Distinction, The, by Rt. Rev. J. W. Hunkin, 485
Ceratostigma, 172
Griffithii, 176
Cesalpina sepiaria, 372
Cestrum aurantiacum, 216, 341
Chaenomeles Clayden, lxx
japonica, 81, 420, 423
lagenaria, 81, 423
Maulei, 423
Chalaropsis thielaviodides, 271
Chamaecyparis Lawsoniana, 3, 468
nootkatensis, 3
var. aurea, 468
obtusa, 468
Chamaerops excelsa, 182, 226
humilis, 182, 227, **234**
Cherry Merton Heart, **A.M.** xxvii
Seedling, selected for trial, lxxii
No. 185, **A.M.** xxvii
No. 418, **A.M.** xxvii
No. 490, **A.M.** xxvii
Wils Fruhe Herz Kirsche, selected for trial, lxix
Chimonanthus fragrans, 48
fragrans var. luteus, 47
Chionodoxa cretica, 16
Luciliae, 80
sardensis, 80
Chionoscilla Allenii, 80
Choice Shrubs, by Michael Haworth-Booth, **418**
Chorizema ilicifolium, 81
Chrysanthemum (e) Alexander Winton, xxvii
(e) Alpine, **A.M.** 1947, selected for trial, lxxxiv, 487
(e) Althorpe, **A.M.** 1938...204

Chrysanthemum (e) Amber Vale, **A.M.*** 1946, selected for trial, xxvii, 126
  American Beauty, 365
  (e) Angela, 203
  (e) Arnhem, **A.M.*** 1946...204
  (e) Astra, lxxxv
  (e) August Glory, 203
  (e) August Red, **A.M.*** 1946...205
  (e) Autumn Glow, **A.M.** 1947, selected for trial, lxxxiv, 487
  (e) Betty Riley, **A.M.** 1946, selected for trial, xxvii, 121
  (e) Blenheim, xxvii
  (e) Bo-peep, **A.M.*** 1946...204
  (e) Bronze Sweetheart, xxvii
  (e) Bubbles, 205
  (e) Bulwark, **A.M.** 1946, selected for trial, xxvii, 121
  (e) Butterglow, **A.M.** 1939...203
  (e) Caesar, **A.M.** 1943...204
  (e) Carol, **A.M.** 1947, selected for trial, lxxx, 454
  Cascade, 17
  (e) Chamois, **A.M.** 1942...205
  Charm, 17, **28**
  (e) Chas. E. Morris, selected for trial, lxxxiv
  (e) Christine Sweetheart, selected for trial, xxvii
  (e) Cicero, 203
  (e) Coral Glow, xxvii
  (e) Cotswold White, **A.M.** 1946...41
  (e) Cream Bouquet, 203
  (e) Cream Duchess, **A.M.** 1946, selected for trial, xxvii, 121
  (e) Cream Felicity, 203
  (e) Cressington, 204
  (e) Crimson Firedrake, selected for trial, lxxxiv
  (e) Day Dream, 204
  (e) Diane, 204
  (e) Dorothy Speat, **A.M.*** 1946...204
  (e) Dorothy Vernon, **A.M.** 1946...41
  (e) Duchess, xxvii
  (e) Eastmoor Red, 205
  (e) Edensor, **A.M.** 1947...203, lxxx, 454
  (e) Edith Gibbs, selected for trial, lxxxiv
  Eelworm and its control, by G. Fox Wilson, 364
  (e) Egerton Sweetheart, **A.M.*** 1946, [204
  (e) Ellen of Lake, iii
  (e) Evening Glow, xxvii
  (e) Fair Maid, **A.M.*** 1946...204
  (e) Firedrake, **A.M.** 1946...205
  (e) Flavius, **H.C.*** 1946...203
  (e) Florence Meridan, xxvii
  (e) Freda Pearce, 204
  Friendly Rival, 365
  Glorious, selected for trial, v
  (e) Golden Chance, selected for trial, xxvii
  (e) Golden Circle, **A.M.*** 1946...203
  (e) Golden Dawn, selected for trial, xxvii
  (e) Gold of Ophir,* **A.M.** 1947, selected for trial, lxxxiv, 488
Chrysanthemum (e) Gwen Bernard, iii
  (e) Harmonious, **A.M.** 1938...203, 365
  (e) Hartswood Gem, iii
  (e) Harvest Moon, **H.C.** 1939...203
  (e) Henry Ivill, lxxxv
  (e) Herbert Sutcliffe, **A.M.** 1939...203
  hispanicum radicans, lxix
  (e) Hyde, 204
  (e) Imperial Yellow, **F.C.C.*** 1946, 203
  (e) Ina, lxxxv
  Incurved Alfreton Beauty, v
  indicum, 18, 364
  Jane Ingamells, 365
  (e) Joan Fellowes, 205
  Korean, Fuchsia Rose, selected for trial, vii
    Tangerine, selected for trial, vii
    Tapestry Rose, selected for trial, vii
    Wedding Day, selected for trial, xxviii
  (e) Ladybower, **A.M.** 1946...41
  (e) Lapworth, 205
  (e) Lettice, 203
  (e) Lyric, xxvii
  (e) Madeline, 204
  (e) Marion, 203
  Matchless, selected for trial, v
  maximum Wirral Giant, selected for trial, lxxii
    Supreme, lxxii
  (e) Mayford Orange, **A.M.** 1947, selected for trial, lxxxiv, 488
  (e) Mayford Pink, lxxxv
  (e) Millersdale, **A.M.*** 1946...203
  Monument, 365
  (e) Moonstone, 203
  (e) Mosquito, **F.C.C*** 1946...203
  (e) New Countess, lxxxv
  (e) New Sanctuary, lxxxv
  (e) Oceanic, iii, 205
  (e) Orange Gem, 203
  (e) Patricia, selected for trial, xxvii
  (e) Patricia Wilson, lxxxv
  (e) Peach Una, **A.M.** 1947, selected for trial, lxxxiv, 488
  (e) Peakland Snow, lxxxv
  (e) Pearl Sweetheart, lxxxv
  (e) Picture, lxxxv
  (e) Primrose Alabaster, xxvii
  (e) Primrose Barbara, lxxxv
  (e) Radar, **A.M.*** 1946...203
  (e) Red Caesar, **A.M.** 1947, selected for trial, lxxxiv, 488
  (e) Red Sweetheart, **A.M.*** 1946...205
  Regale Favourite, Silver-Gilt Banksian Medal, xxx
  (e) Rhapsody, lxxxv
  (e) Richard Hicks, xxvii
  (e) Ronald, **F.C.C.*** 1946...205
  (e) Rose Bouquet, 204
  (e) Rose Queen, lxxxv
  (e) Royal Rose, lxxxv
  rubellum, 341, 364, 381
    attacked by Leaf Eelworm, Aphelenchoides ritzema-bosi, **357**

Chrysanthemum (e) Salmon Sweetheart, **A.M.*** 1946, 42, 204
  (e) Salmon Una, **A.M.** 1947, selected for trial, lxxxiv, 488
  (e) Shell Bouquet, **A.M.*** 1946...204
  (e) Shirley Cream, 203
  (e) Shirley Yellow, 203
  sinense, 364
  (e) Solidity, selected for trial, lxxiv
  (e) Sparkler, **A.M.** 1946...205
  (e) Spartan, **A.M.** 1940...205
  (e) Springtime, lxxxv
  Stella, 365
  (e) Success, 203
  (e) Sunstroke, lxxxv
  (e) Sweet Sue, selected for trial, xxvii
  (e) Tempest, **A.M.** 1947, selected for trial, lxxxiv, 488
  (e) Terra-Cotta Freda, **A.M.** 1949...205
  (e) Tibshelf Orange, **A.M.** 1947, selected for trial, lxxxiv, 488
  (e) Tiny Tot, **A.M.*** 1946...205
  (e) Treasure, 203
  (e) Typhoon, **A.M.** 1947, selected for trial, lxxxiv, 488
  (e) Vanguard, **A.M.** 1947, selected for trial, lxxx, 454
  (e) Victoria, 203
  Wendy, 365
  (e) White Lady, **A.M.** 1938...203
  (e) Yellow Corona, **A.M.** 1946, selected for trial, xxvii, 121
  Yellow Gown, 365
  (e) Yellow Spur, selected for trial, xxvii
Chrysanthemums, 306
  Warm water sterilization, 367
  (e) at Wisley, 1946...202
Chrysocoma coma-aurea, 227
Cimicifuga racemosa, 260
Cirsium eriophoroides subsp. bolocephalum, 167, **187**
Cistus albidus, 249
  × cyprius, 249
  ladaniferus, 249, 425
  laurifolius, 249
  Loretii, 425
  monspeliensis, 425
  populifolius var. lasiocalyx, 425
  pulverulentus, 249
  × purpureus, 249
  salvifolius, 100
  sp., 223
  villosus, 100, 101, 249
Citharexylum, 233
  cyanocarpum, (Rhapithamnus cyanocarpus), 188
Clematis alpina, lxiv
  cirrhosa, 47, 100, 101
  flammula, 225
  florida, 263
    plena, lxxvi
  montana var. grandiflora, 133
  orientalis, 134, **142**
  recta, 260
    purpurea, lxx
  Scottii rosea, 387
  Snow Cap, **A.M.** 1946...42, v
Clerodendron Bungei, (foetidum), 381
  trichotomum, 341
Clethra, alnifolia, 296
  arborea, 186, 224
Clianthus puniceus, 188, 227
Clivea Gardneri, 188
Cocos campestris, 226, 227
Codonopsis clematidea, 260, lxx
  convolvulacea, 171
  mollis, 141, 144, 166
  nervosa, 169
  ovata, 260
  vinciflora, 171, **187**
Coelogyne cristata, 87
  Mooreana, 87
  ocellata, 87
  ochracea, 87
Colchicum hybrids, 341
Coleonema, 228
  album, 228
  roseum, 228, 235
Coleus, 193
Colletia bictonensis (cruciata), 185
Colquhounia, 176
Conandron ramondioides, 259
Conifers at Mount Usher, Co. Wicklow, by Comm. F. Gilliland, 237
"Conservation of Nature in England and Wales," reviewed, 456
Convolvulus althaeoides, 296
  holosericeus, **A.M.** 1946...42
  mauritanicus, 188, 231
Cooper, E., on Orchids for Amateurs, 83
Coprosma Baueri, 223
  Cunninghamii, 229
Cordyline australis, 189
  erythrorachis, 231
  indivisa, 189
Coreopsis Winifred Piggot, lxxvii
Corn, Sweet, 96, 98
  Sweet, Canada Cross, 98
    Fogwills Early, 98
    John Innes, 98
Cornus florida var. rubra, 164
  Kousa, **357**, 371, 419, 420, 424
    var. chinensis, **357**, 371
  mas, 48
  Nuttallii, xxx, 159, lxxxii
  sanguinea, 2
  stolonifera, 2, 468
Coronilla glauca, 236
Correa alba, 4, 185
  pulchella, 228
    = speciosa, 187
  speciosa var. Harrisi, 4, 81
  virens, 185, 229
Corylopsis pauciflora, 47
Corynocarpus laevigata, 233
Cotoneaster, 172, 175, 176
  conspicua var. decora, 418
  Deilsiana, viii
  Franchetti, 107
  glaucophylla, 467
  Harroviana, 227
  horizontalis, 341, 417
  integerrima, 137
  lactea, 417

Cotoneaster microphylla, 137
  pannosa, 467
  rotundifolia, 4, 467
  salicifolia var. floccosa, 417
  serotina, 417
  sp., xxx
Cotton, A. D., on The Spring-flowering Buddleias, 427
Cotyledon sp., 223
  velutina, 187
Cowan, Dr. J. Macqueen, on Rhododendron yakusimanum, 391, **395**
Cox, E. H. M. on Plant Hunting in China, **101**, 110
Crassula coccinea, **234**
  Cooperi, 296
  decussata, 188
  sarcocaulis, 296
  sp., 233
Crataegus, 306
  Crus-Galli, 108
  uniflora, 386
Cremanthodium humile, 169
  palmatum subsp. rhodocephalum, 144, 169, 186
  plantagineum, 140, 170
  rhodocephalum, 170
  Sherriffii, 170
Cremanthodium Thomsonii, 140
Crinum × Krelagei, lxxx
  × Powellii album, lxxx
Crocus heterochromos, 16
  hyemalis, 70
  iridiflorus, 417
  karduchorum, viii
  laevigatus, iv, 417
  niveus, 417
  nudiflorus, 340
  ochroleucus, 70
  speciosus, 340
    Aitchisonii, xxviii
  zonatus, 340
"Crop Production in Frames and Cloches," Bull. No. 65, Min. of Agric. reviewed, 491
Crowea saligna, 187
Cryptomeria elegans, xlix
  elegans var. albo-variegata, xlix
    var. Bandai-Sugi, xlix
    var. cristata, xlix
    var. knaptonensis, xlix
    var. monstrosa, xlix
    var. monstrosa nana, xlix
    var. pygmaea, xlix
  japonica, vi, xxvii, xxviii, lxxvi
    var. elegans, 239, lxxix
Cucumber, Frame, 96, 98
  Frame, Conqueror, 99
  Ridge, 96, 98
    Hampshire Giant, 99
    Perfection, 99
"Cultural table of Orchidaceous Plants," by J. Murray Cox, reviewed, 490
Cunninghamia Konishii, 238
  lanceolata, 238
  sinensis, **235**
Cuphea micropetala, 416
Cupressus arizonica, 239
  Duclouxiana, 238, 240
  funebris, 239
  Lawsoniana, 7, 239
    Allumii, 109
    var. elegantissima, 240
    erecta viridis, 109, 238, 239
    var. filifera, 238
    var. Stewartii, 238
    var. tamariscifolia, 239
    Triumph de Boskoop, 239
    var. Wisselii, 230, 239
  lusitanica, 237
    var. glauca pendula, 240
  macrocarpa, 178, 187, 221, 224
    var. Lambertiana, 235
    var. lutea, 240
  Manabiana, 239
  nootkatensis, 7
    pendula, **235**, 238
  sempervirens, 101
Currant, Black, Christine Dodson, lxxix
  Red, Laxton's No. 1, lxxii
    Red Lake, lxxii
Cyananthus incanus, 169
  lobatus, 144, 166, 169, 260
  macrocalyx, 169
  microphyllus, 340
  Sherriffii, 173, 260, 340
  spathulifolius, 140, 144, 169
Cyathea medullaris, **234**
Cyatheas, 235
Cyclamen africanum, lii
  album, 4
  cilicicum, lxxxiv
  coum, 4, 487
    creticum, lii
  europaeum, F.C.C. 1946...42
  hederifolium subsp. creticum, 16
  ibericum, 4, 417
  neapolitanum, 340
  persicum, 70, xxx, lii
  repandum, lii
  vernum var. hiemale, 487
Cydonia japonica, 81
  Maulei, 81, 420
Cymbidium Adele Sander, P.C. liv
  Adelma var. Springtime, 331
  Alexanderi, 333
    var. magnolia, 331
    Westonbirt variety, 328, 331, 332
  Alrita, liv
  Balkis, F.C.C. 1935...328, 331, 332
  Bodmin Moor var. Grace, A.M. 1947, liv, 289
  Butterfly, 328
  Caer Brito, 331
  Ceres, 328, 330
  Diadem, li
  Dorchester, 328
  Doris, 333
  eburneum, 328, 330
  erythrostylum, 328, 330
  Finlaysonianum, 333
  Flamingo, 328, 332
  giganteum, 333
  Glasgow, var. Moonbeam, P.C. lii
  Hawfinch var. Daffodil, liv

Cymbidium Imbros, **A.M.** 1947, lii, 289
  Inamorata var. Lycaste, **A.M.** 1947, l, 289
  insigne, 328
  Joan, 333
  Lantern, liv
  Lowianum, 330
  Merlin, 328
  Mildred Hunter, liv
  Miretta, **P.C.**, liv
  Nam Khan, **F.C.C** 1946...**815**, 331
  Nathaniel, **F.C.C** 1946...**815**, 331
  Nefertiti var. Celeste, **A.M.** 1947, 289, lvi
  Nimrod, **A.M.** 1946...**815**, 331
  Parishii, 328
  Paulwelsii, 328, 330, 331
    var. Comte de Hemptinne, **F.C.C.** 1931...**815**, 331, 332
  Queen Elizabeth, var. Enchantress, **A.M.** 1947...l, 289
  Rhoda, **A.M.** variety, 332
  Rosanna, 328, 331
    var. Pinkie, 331, 332
  Solent, Cultural Commendation, lii
  Starlight, **F.C.C** 1947, xlviii, 289
  Swallow, li
    Exbury var. **F.C.C** 1947...**815**, 331 lxi, 403, Silver Lindley Medal
    var. Oriole, **F.C.C** 1947, liv, 289
Cymbidiums, by B. Hills, 327
Cypripedium × A. de Lairesse var., Excelsior Cultural Commendation, lii
  Bahram Orchidhurst var., **A.M.** 1946...120
  Banchory, **A.M.** 1946...121, xxxi
    Dukes Edge var., **A.M.** 1947, xliv, 289
  Bladon var. Peacock, xxxi
  Braile's var. Rusper, xxxi
  Brill var. Ann Page, xlvi
  Cameo, Cultural Commendation, xlvi
  Chryscurte, xlviii
  Delenatii, xlvii
  Dianthus var. Springtide, xlvii
  Grace Darling, **100**
  Happy Landing, xlvii
  Harmachis var. Golden Radiance, **A.M.** 1947, xlvi, 290
  Helas Westonbirt, var. **F.C.C** 1947, xlviii, 290
  hirsutissimum, **60**, 73
  insigne, 87
  × Joyce Ruck, **A.M.** 1946...42
  Ludovic Fraey's, xlviii
  Nofrure, xxxi
  Paddy Joe var. Neil, xlvii
  Ravenswing, xlvi
  × St. Swithin, **A.M.** 1946, iii, 42
  sp., 172
  Whitehall var. Pleiades, **A.M.** 1947, xlvi, 290
Cypripediums, 74
  Cyrilla racemiflora, 340
Cyrtanthus lutescens, 81
  Mackenii var. Cooperi (lutescens), 416
Cytisus × Adami, lxxi
  aspalathoides, lxvi
  Burkwoodii, 165
  Cornish Cream, 165
  Dallimorei, 165
  racemosus, 189
  scoparius, lxvii, 419, 424
    Andreanus, lxvii
  sp. 223
  Sunrise, lxx
Daboecia polifolia (cantabrica) var. purpurea, 417
Daffodils at Dawyck, **22**
Dahlia Admiral, 114
  Alloway, **H.C.** 1939...117
  Amber Queen, 114
  Animato, 118
  Anne Lister, 117
  Apiary, **H.C.*** 1946...116
  Arabeske, 118
  Aristos, 114
  Art, 116
  Barbara Brown, 118
  Barry Cotter, 117
  Bengee, selected for trial, vi
  Beryl, **H.C.*** 1946...118
  Bettabracht, 117
  Bevryding, 117
  Bonanza, selected for trial, lxxx
  Bonus, selected for trial, lxxx
  Bourne Crimson, selected for trial, iii
  Braywick Bedder, 115
    Charm, **H.C.*** 1946...115
    Fancy, 115
  Brentwood Bedder, **H.C.*** 1946...115
  Brightness, **A.M.*** 1946...115
  Brown Bear, selected for trial, lxxx
  Burnet, **H.C.*** 1946...114
  Busy Gem, **H.C.*** 1946...113
  Buttercup, 114
  Butterfly, 113
  Cease, Fire, 114
  Cecile, selected for trial, lxxx
  Charlotte Collins, 114
  Cherie, 118
  chimeras, i
  Clyde Reeves, selected for trial, vi
  Colonel W. M. Ogg, 114
  Conqueror, 117
  Craigpark Gem, **A.M.*** 1946...114
  Daily Delight, 118
  Dainty Rose, 118
  Diamant, **H.C.*** 1946...114
  Dick, **H.C.** 1932...117
  Dobbie's Bedder, 115
  Dora Ramsey, **A.M.** 1946, selected for trial, vi, 43
  Dorothea's Orange, **H.C.*** 1946...117
    Success, 118
  Dorothy Tatham, 114
  Duveltje, 118
  Edith Morell, 114
  Elegy, **H.C.*** 1946...116
  Elfin, **H.C.*** 1946...117
  Elizabeth Brown, 118
  Elsie, 118
    Wilding, selected for trial, lxxx
  Elsje, selected for trial, lxxxi

Dahlia Eureka, 115
  Evelyn Ogg, 114
  Fairholme, **H.C.*** 1946...118
  Fairy, 113
  F. E. Hopper, selected for trial, lxxx
  Festive, selected for trial, vi
  Fijnstraal, 119
  Firefloat, **A.M.*** 1946...114
  Fireman, selected for trial, lxxx
  Firetail, **H.C.*** 1946...116
  Fuzee, 115
  F. Wilson, 115
  George Lawrence, selected for trial, iii
  Glacier, selected for trial, lxxxiv
  Golden Leader, **H.C.*** 1946...116
    Wedding, 117
  Golly, 118
  Grace Affleck, 113
  Grappenhall, 113
  Gratiola, 118
  Grebe, selected for trial, lxxxiv
  Greta Woodhouse selected for trial, lxxxiv
  Heide Jescot, selected for trial, iii
  Helen Stamford, selected for trial, lxxxi
  Helios, 117
  Herbert Brown, 114
  Heron, **H.C.*** 1946...116
  Hilda, 114
  Hopeful, selected for trial, lxxxi
  Jean Baxter, 118
  Jescot Dula, selected for trial, lxxx
    Jess, selected for trial, lxxx
    Kenny, selected for trial, lxxx
  Jester, 116
  Jo Blaauw, **H.C.*** 1946...117
  John James, 113
  Josephine Klimpt, selected for trial, lxxxi
  Joyfull, 116
  Kennet, **A.M.*** 1946...118
  Kingsbrook Scarlet, selected for trial, vi
  Ladybird, 115
  Lancastrian, i
  Leiden's Sulphur, **H.C.*** 1946...119
  Leo, **A.M.*** 1946...116
  Lilana, 118
  Lila Triomf, 114
  Lilian Howick, selected for trial, iii
  L'Innocence, **H.C.** 1926...113
  Lion, 114
  Lyrick, 118
  Mab, **H.C.*** 1946...118
  Mackensie, 114
  Mandarin, 115
  Marian Tate, 114
  Marjoleyn, **H.C.** 1946...115
  Maroon Gem, 113
  Mary Ottley, selected for trial, lxxx
    Tutton, 118
  Mat. Tandy, selected for trial, lxxx
  Maureen Creighton, **A.M.*** 1946...116
  Mauveron, selected for trial, iii
  Mayfair, **A.M.*** 1946...117
  Micky Rooney, 116
  Midnight, 114
Dahlia Mrs. Ed. Halstead, **A.M.** 1946, 42
    J. T. Jeffery, 114
    May, selected for trial, lxxx
    Musgrave Hoyle, **H.C.*** 1946...114
  Modette, 117
  Moonflower, 116
  Morning Star, selected for trial, lxxxi
  Morio, 118
  Mother Ballego, 118
  Mystic, 115
  Nirwana, 117
  Norman, 117
  O. J. Prince, 115
  Orange Beacon, 115
    Nassau, selected for trial, 117, lxxxi
    Triomf, 115
  Paisley Gem, 113
  Park Beauty, **H.C.*** 1946...115
  Pauline Gibbard, **H.C.** 1938...117
  Peach Glow, **H.C.*** 1946...115
    Queen, **H.C.*** 1946...117
  Peri, selected for trial, vi
  Perplex, 113
  Perran, 115
  Pictorial, **A.M.** 1942...115
  Piet, **H.C.*** 1946...114
  Pink Coltness, 113
  P.M., selected for trial, lxxxi
  Preferent, 118
  Pretty Maid, selected for trial, lxxxiv
  Princess Maria Jose, **A.M.*** 1946...113
  Radius, **H.C.*** 1946...117
  Red Guard, **H.C.*** 1946...114
  Redskin, 117
  Reedley, selected for trial, lxxxi
  Resplendant, selected for trial, lxxxi
  Reve, 117
  Roland, selected for trial, lxxx
  Roode Zon, 113
  Rosalind Barnes, 115
  Rosario, 118
  Rosary, 118
  Roxhill, selected for trial, lxxxi
  Russett, 118
  Rhythm, selected for trial, lxxxi
  Sabine, **A.M.*** 1946...118
  St. Bernard, selected for trial, lxxx
  St. Helen, selected for trial, vi
  Satan, i
  Searchlight, 117
  Seashell, 114
  Seedling, 43/15, 113
  Sheik, 118
  Sheila Downey, **H.C.*** 1946...114
  Shirley Orange, 114
    White, 113
    Yellow, 113
  Siemen Doorenbos, 113
  Smokey, selected for trial, iii
  Speck, selected for trial, lxxxi
  Sprite, 115
  Standard, lxxx
  Stately, 118
  Sunbeam, 118
  Sunburn, 115
  Susan Alesworth, selected for trial, lxxxi

Dahlia Sussex, lxxx
  Swanley, White, 113
  Sweetness, **H.C.*** 1946...117
  Tango, selected for trial, vi
  Tante Stein, **A.M.** 1938...115
  Topaz, 114
  Torch, **H.C.*** 1946...118
  Towneley Supreme, selected for trial, lxxxi
  Tritoma, 115
  Tritone, **H.C.*** 1946...118
  Tryst, selected for trial, lxxxiv
  Tyne, 114
  Unit, 117
  Valour, 118
  Velva, selected for trial, iii
  Vera Higgins, selected for trial, lxxx
  Vicar, selected for trial, lxxxi
  Vicki, **H.C.*** 1946...117
  Victor, **A.M.** 1938...115
  Victory Day, 119
  Vivianne Coppens, selected for trial, lxxxi
  Waterlily, 116
  Whitegates, selected for trial, lxxx
  White Heart, selected for trial, lxxxiv
  Wings, selected for trial, lxxxiv
  Wild Rose, 115
  Windemere, **H.C.*** 1946...115
  Woodland's Wonder, 116
  Yselmeer, 115
  Zonneglans, 118
Dahlias at Wisley, 1946...113
Dammara australis, 234
Daphne, 170, 176
  Bholua, **A.M.** 1946, i, xxx, 211
  Cneorum, 164, 191, 422
  Genkwa, 164
  Mezereum, 47, 81, 191, lii
    alba Bowles Variety, **A.M.** 1947, liv, 290, lxxiii
    Byford's Variety, liv
    White forms of, lii
  retusa, **A.G.M.**,1946...191, 192
  rupestris var. grandiflora, 164
  tangutica, 192
Daphniphyllum glaucescens, 234
Dasylirion acrotrichum, **187**, 225, 226, **234**
Davidia involucrata, **235**, lxiv, 423
Davis, P. H. on Plants and Experiences in the Eastern Mediterranean, 13
  P. H. on Two Colours, 487
Dawyck (The home and garden of the late Mr. F. R. S. Balfour), by W. Balfour Gourlay, 5
Delphinium Agnes Brooks, **A.M.** 1946, 43
  Beesianum, 174
  Blackmore's Glorious, **A.M.** 1947, selected for trial, lxxi, 403
  Blackout, lxxi
  Blue Dragon Fly, **A.M.*** 1946...251
  Boningale Glory, selected for trial, lxxi
  Brigadier Hotblack, **A.M.** 1938, lxxiii
  Cantata, selected for trial, lxxiii
Delphinium Crystal, **F.C.C.*** 1946...251
  Delius, selected for trial, lxxiii
  Derek Hotblack, selected for trial, lxxi
  Elsie Edwards, **A.M.*** 1946...251
  Emily Wort, **A.M.*** 1946...251
  Granville Bullimore, selected for trial, lxxi
  Harvest Moon, selected for trial, lxxi
  Jennifer Langdon, **A.M.** 1946, lxxi, 43
    Milligan, **A.M.** 1947, selected for trial, lxxiii, 454
  Kingston Gem, Banksian Medal, selected for trial, lxxv, lxxvi
  Madeleine, selected for trial, lxxi
  Mary Denney, selected for trial, lxxi
  Michael Blackmore, (selected for trial 1945), lxxi
  Mother of Pearl, **A.M.** 1946...43
  Sceptre, lxxiii
  Seedling, selected for trial, lxxi, lxxiii
    A. 2, selected for trial, lxxi
    No. 5, selected for trial, lxxiii
  Sonia Hotblack, **A.M.*** 1946...251
  Sylvia Blackmore, **A.M.** 1946...43
  viscosum, 175
  Watkin Samuel, **A.M.** 1946...43
  Whitethroat, **A.M.*** 1946...251
Delphiniums, **2**
Dendrobium aureum, 87
  chrysanthum, 87
  chrysotoxum, 87
  crepidatum, 87
  falcorostrum, 87
  infundibulum, 87
  Jamesianum, 87
  macrophyllum, 35
  nobile, 87
  speciosum, 87
  thyrsiflorum, **100**
Deschampsia caespitosa, lxxiv
Desfontainea spinosa, 26
Deutzia gracilis, 107
  rosea, 164
Dianella caerulea, 188
  tasmanica, 186
Dianthus Allwoodii, Silver-Gilt Banksian Medal, Silver Banksian Medal, Flora Medal, liii, lv, lxix
  Allwoodii alpinus Apollo, lxvi
    alpinus Elf, lxvi, lxviii
      Wink, lxviii
      Wisp, selected for trial, lxviii
    Belinda, selected for trial, lxx
    Edward, selected for trial, lxxiii
    Eva, selected for trial, lxx
    Isobel, selected for trial, lxx
    Margaret, selected for trial, lxx
    May, selected for trial, lxvi
  arvensis, 216
  caesius, 216
  Carthusianorum, 22, **23**
  Caryophyllus, 20, 21
  chinensis, 22, **23**
  Crimson circle, selected for trial, lxvi
  Grace Harvey, lxxiii

Dianthus hybrida multiflora, selected for trial, lxx
  Lily Collins, lxx
  pindicola, **A.M.** 1947, lxxiv, 454
  Plumarius, 21
  Pride of Austria, 22
  Snow White, selected for trial, lxvi
  superbus, 22
  Winteri, Banksian Medal, lxxii
  Wirral Beauty, lxxiii
    Fragrance, lxxiii
Diapensia himalaica, 137
  sp., 172
  Wardii, 173
Dicentra eximia, 386
Dicksonia, 235
  antarctica, **234**
Dionysia, 240, 241
  curviflora, 13
Diosma, hirta, 188
  speciosa, 188
Diostea juncea, lxx
Diplacus glutinosus, 341
Diplarche multiflora, 136, 172
  pauciflora, 142, 173
Dipteronia sinensis, lxxix
Disanthus cercidifolius, 340, 380
Dodecatheon Meadia, 284
Dolichos lignosus, 186
Donations to the Society's Gardens at Wisley, 1946, xxxi, xlviii
Doryanthes Palmeri, 225
Draba bryoides imbricata, **A.M** 1947, lviii, 373
  mollissima, lviii
Dracaena draco, 185
  indivisa, 181
  Scilloniensis, 188
Dracaenas, 182
Dracocephalum Hemsleyanum, 174
  virginianum Vivid, 458
Dracunculus vulgaris, 285
Drimys aromatica, 188
  colorata, 231
  Winteri, 234
Dryandra formosa, 228
Durham, Lt.-Col. Frank Rogers, C.B.E., M.C., 217, **234**

Echeveria sp., 223
Echium, 236
  Auberianum, 230
  callithyrsum, **187**, **234**
  judaicum, 103
  Pininana, 230
  scillowensis, **234**
  sp., 223
  Wildpretii, 230
Edwardsia microphylla, 184
  grandiflora, 188, 190
Eichornia crasspies, 26
Elaeagnus, 176
  spinosa (angustifolia), 185
  umbellata, 134
Elaeocarpus cyaneus, 235
Elaeodendron capense, 233
Electricity in the garden, by C. A. Cameron-Brown, 274
Electron excelsa, 234
Eley, Charles, on Arbutus Menziesii, **23**, 32
Elsholtzia sp., **187**
Embothrium coccineum, 25, 111, 112, 186, 424
  lanceolatum, **A.M.**, 112, lxviii
    Norquinco Form, **A.M.** 1947...404
Endive, 96
Enkianthus, 10, 176
  perulatus, 340
Entelea arborescens, 234
Epacris ardentissima, 416
  impressa, 416
  sp., 4
Ephedra familifloris, 101
Epidendrum vitellinum, 87
  vitellinum var. dichromum, 87
    var. fragrans, 87
    var. majus, 87
    var. nemorale, 87
Epimedium pubigerum, 287
Epipactis helleborine, lxxxii
  latifolia, lxxviii
  purpurata, lxxxii
Equus hemionus, 176
Eranthis Tubergenii, 48
Eremurus spectabilis, lxiv
Eria coronaria, 87
Erica arborea, 129
  arborea alpina, 80, 129, 165
  australis, 129
    var. Mr. Robert, 129
  canaliculata, 4, 416
  carnea, 3, 48, 80, lxxvi, 417
  Cavendishiana, 186
  ciliaris, 260
  cinerea, 260, 419, 427
    var. coccinea, 260
    var. Domino, 260
    var. rosea, 260
  × darleyensis, 3, 48, 80, 417, 467
  Dawn, 260
  glandulosa, 228
  lusitanica, 3, 48
  mediterranea, 80, 129
  tetralix, 260
  vagans, 380, 417
    var. Mrs. Maxwell, 340
  × Veitchii, 3, 48
  ventricosa magnifica, 4
Erinacea Anthyllis, 14, 164
  pungens, 14
Erinus alpinus var. Barbara Hammer, **A.M.** 1947, lxvi, 488
Eriocephalus africanus, 228
Erodium arborescens, 13, **88**
Erythrina splendens, 30
Erythronium americanum, 385
Escallonia florbunda alba, 185
  macrantha, 35, 184
  montevidensis, 185
  organensis, 234
  pterocladon, 187
  revoluta, 232
  rubra, 187
Eschscholzia Aurora, 210
  Carmine King Improved, 210

Eschscholzia Creamy Crinkles, 209
  Crocea Flore Pleno Improved, H.C.* 1946...209
  Delightful, 209
  Double Orange, 210
  Fireglow, 210
  Flambeau, 210
  Flame, 210
  Harvest Gold, 209
  Moonlight, 209
  My Favourite, 210
  Pulchella, 209
  Red Chief, 210
  Robert Gardiner, C.*1946...209
  Rose Dawn, 210
  Rosy Queen, 210
  Sunbeam, 209
  Sweetheart, 210
Eschscholzias at Wisley, 1946...209
Eucalyptus coccifera, 188, 453
  cordata, 454
  cordifolia, 224
  in England, 453
  ficifolia, 229
  globulus, 186, 188, 189, 224, 232, 233
  Gunnii, 453, 454, 457
  obliqua, 234
  Perinniana, 454
  pulverulenta, 224
  saligna, 185
  sp., 223
  subcrenulata, 454
  urnigera, 454
  whittinghamensis, 457
Eucomis punctata, 186
Eucryphia Billiardieri, 427
  cordifolia, 227, 297
  glutinosa, 260, 297, 380, 419, 420, 427
  × nymansensis, 260, 297, 427, 437
  pinnatifolia, 419
  × Rostrevor, viii
Eugenia apiculata (Myrtus luma), 187
  Ugni, 185, 227
Euonymus, 172, 341
  fimbriatus, 235
Eupatorium macranthum, 227
Euphorbia, 235, 241
  acanthothamnos, 16
Euryops virgineus, 190, 230
Evodia hupehensis, 234
Extracts from the Proceedings of the R.H.S., i, ix, xxix, xxxiv, xlix, lii, lxi, lxv, lxxvii

Fabiana imbricata, 26
Fagus sylvatica var. fastigiata, 8
Ficus macrophylla, 232
Fitzroya cupressoides, 239
"Forest, Forestry and Man, The," reviewed, 491
"Forestry Practice" Bull. No. 14, of the Forestry Commission, reviewed, 336
Forsythia × clandonensis, lvi
  Giraldiana, 48, 80
  × intermedia, lvi
  ovata, 80
  spectabilis, 48
Fothergilla alnifolia var. major, 192
  major, A.G.M. 1946...187, 192, 380
  sp., 385
Fraxinus pennsylvanica, 30
Freesia Carmen, selected for trial, li
  Caro Carlee, selected for trial, l
  Delight, selected for trial, l
  Glorious, selected for trial, l
  Goldcup, selected for trial, li
  Magnificence, selected for trial, li
  Neptune, selected for trial, li
  Orange-Nassau, selected for trial, li
  Snowdrift, selected for trial, l
French Fruit Garden at Foots Cray Place, by N. B. Bagenal, 71
Fritillaria conica, 15
  Davisii, 15, 23
  Ehrhardii, 15
  messanensis, 16
  Tuntasia, 15
"Fruit Bud Development," Bull. No. 137, Min of Agric., reviewed, 256
"Fruit Fall and its control by Synthetic Growth Substances," by M. C. Vyvyan, reviewed, 256
Fuchsia Admiration, 445
  arborea, 227
  Balkon, 444
  Caledonia, 444, 445
  Caledonica, 444
  Cascade, 437, 444
  cordifolia, 223
  Corren, 444
  Countess of Aberdeen selected for trial, lxxvii
  Coxeen, selected for trial, lxxvii
  David, 443
  Dominiana, 180
  Earl Beaconsfield, selected for trial, lxxvii
  Evelyn Little, 444
  excorticata, 233, 439
  fulgens, 223
    Lee's variety, Cultural Commendation, lxxv
  Glow, 444, 445
  Immaculate, 445
  Jewel, 445
  Kathleen, 444
  Lena, 444
  Lottie Hobby, 443
  Mme. Cornelissen, 444
  magellanica, 439
    alba, 444
    gracilis variegata, 444
    pumila, 443
    var. Riccartonii, 297, 419, 426, 445
  Margaret, 444, 445
  Markinka, 444
  microphylla, 416, 467
  Mrs. Marshall, 444
    W. P. Wood, 444
  Muriel, selected for trial, 444, lxxvii
  procumbens, 381, 439, 443
  pumila, 445
  Rose Pearl, 444
  Royal Purple, selected for trial, lxxvii

Fuchsia splendens, 185, 223, 233
  Thalia, vi
  The Doctor (syn. Mrs. H. Roberts), 444
  × Thomsonii, 444
  triphylla, 223
  Venus Victrix, 443
  venusta, 443
  Wave of Life, 444
Fuchsias, by W. P. Wood, 438
Funkia lancifolia, 188
Furcraea, 229
  longaeva, 185, 223

Gage Elmgage, lxxxii
Galanthus byzantinus, 47
  Elwesii, 47
  latifolius, li
  nivalis, li
  rhizensis, 4
  Galium aretioides, 14
"Gall Midges of Economic Importance," by H. F. Barnes, reviewed, 336
"Gall Midges of Fodder Crops," by H. F. Barnes, reviewed, 336
"Gall Midges of Root and Vegetable Crops," by H. F. Barnes, reviewed, 336
Galtonia (Hyacinthus) candicans, 235
"Garden Bulbs in Colour," by J. Horace McFarland, R. Marion-Hulton, and Daniel J. Foley, reviewed, 459
"Garden Enemies," by Ursula Newman, reviewed, 459
Gardener looks at his flower vases, The, by John Adams, 469
"Gardener's Chance," by Roy Hay, reviewed, 376
Gardening, Continuous Cloche, by C. P. Quarrell, 88
Gardening in Lima, by Christopher Sandeman, 23
Garrya elliptica, viii
Gasteria carinata, 189
  nigricans, 186
Gaultheria Shallon, 159
Gaultherias, 340
Gazanias, 340
Genista albiflora procumbens, 184
  cinerea, 419, 426
  filipes, 190
  hispanica, 423
  lydia, **A.G.M.** 1946...**187**, 192
  monosperma, 231
  virgata, 419
Gentiana acaulis, 128
  amoena, 174, 176
    forma pallida, 174, 175
  amplicrater, 174, 175
  asclepiadea, 296, 340
  cachemirica, lxxviii
  cerastiiformis, 142
  decorata, **186**
  depressa, 174
  Elwesii, 137
Gentiana epiporphyra, 168, 173
  × Farorna, **A.M.** 1946...43
  Farreri, 296, 340
  filistyla, 169
  gilvostriata, 173
  gracilipes, 296
  infelix, 169
  lagodechiana, 260
  Loderi, **A.M.** 1946...43
  Macaulayi, 340
  nubigena, 144
  ornata, 296
    var. dichroa, 169
  phyllocalyx, 140
  pumila, **A.M.** 1947...128, 373, lviii
  Przewalskii, 168, 172
  rhodandra, 173
  septemfida, 260
  Sherriffii, 142, 169, **187**
  sikkimensis, 168, 173
  sino-ornata, 137, 172, 173, 340, 417
  speciosa, 176
  tibetica, lxxvi, lxxviii
  trichotoma, 168
  tsarongensis, 168, **186**
  tubiflora, 172
    var. namlaensis, 140, 142
  Veitchiorum, 173, **187**
  Vorna, **A.M.** 1946...160
  Waltonii, 171, 174, 175
  Wardii, 172
"Goethe's Botany," by Dr. Agnes Arber, reviewed, 124
Geranium pyrenaicum, lxvii
  subcaulescens, 487
  Wallichianum, 401
    Buxton's Variety, 401
Gerbera Jamesonii, 29
Geum intermedium, lxvii
  rivale, lxvii
  urbanum, lxvii
Gilliland, Comm. F., on The Conifers at Mount Usher, Co. Wicklow, 237
Gingko biloba, 30, 32, 240, 288, 446
Gladiolus aleppicus, 70
  corms, lxxi
  var. Paradise, li
  segetum, 70
  tristis, 29
Gladwin, Grace, on The Old Carnations and Pinks, 19, 74
Glenn, E. M., R. G. Hatton and A. W. Witt on Preliminary investigations. on the growing of Walnuts in England, 269
"Glaieuls, des," by F. Roehens, reviewed, 492
Gloeosporium perennans, 154
Gloriosa Rothschildiana, 235, lxxvi, lxxviii
Gloxinia speciosa, 34
Goodia latifolia, 233
Gooseberry Hodsdon's Early Market, lxxiv
Gourlay, W. Balfour, on Dawyck, 5
    on The Lost Scent of Mimulus moschatus, 285
Grape Thompson's Seedless, 345

Grevillea rosmarinifolia, 190
  Banksii, vi
  robusta, 29
Greyia Sutherlandii, 230, 236
Griselinia intermedia, 232
  lucida, 188, 232
Growth regulating substances in horticulture, by Thomas Swarbrick, Part I, 313; Part II, 342
Gueldenstaedtia himalaica, 132

Haberlea Ferdinandi-Coburgi, 164
Habrothamnus (Cestrum) elegans, 187
Hadden, N. G. on Some Small-growing Kniphofias, **315**, 334
Haematelia, 235
Hakea, 236
  denticulata, 184
  gibbosa, 229
  microcarpa, 185
  oleifolia, 185
  suaveolens, 182, 184, 223, 225, 233
Halesia carolina, 385
  diptera, 385
  monticola, 385, **394**
  parviflora, **385**
Halleria lucida, 232
Hamamelis japonica, 3, 47, 48, 80, 380
    var. arborea, 48
    var. Zuccariniana, 48
  mollis, 3, 47, 80, 381
Hanbury, Dorothy, on Agaves at La Mortola, **357**, 372
Hanger, Francis on Camellias and their culture, 59
    on Rhododendron yakusimanum, 393, **395**
Harding, W. F. W. on Horticultural Planting of the Imperial War Graves Commission in N. Europe, 104
Hardy, Capt. Eric, on The flowering shrubs of Palestine, 100
"Harnessing the Hormone," by T. Swarbrick, reviewed, 76
"Harvesting and Storing Garden Fruit," by Raymond Bush, reviewed, 492
Haworth-Booth, Michael, on Choice Shrubs, 418
Haworthia sp., 223
Hedera, 176
Hedychium, 234
  coronarium, 25, 223
  Gardnerianum, 223
Helianthemum elipiticum, 103
Helianthus orgyalis, **A.M.** 1946, v, 121
Helichrysum Billardieri, 14
  frigidum, 340
  petiolatum, 230
  virgineum, 14
Heliosperman micrantha, lxix
Heliotropium peruvianum, 25
Helleborus orientalis, 47
Henry, Mrs. J. Norman on Uncommon American Shrubs and Plants, 382
Hepatica angulosa, 48
"Herbal Delights" by Mrs. C. F. Leyel, reviewed, 490
Hesperaloe lineata, lxxxv
Hesperoyucca Whipplei, 229
Hibbertia dentata, 467
  volubilis, 467
Hibiscus, 25
Hieracium Waldsteinii, lxiv
Higgins, Mrs. Vera, V.M.H. 1946, **61**
Hills, B., on Cymbidiums, 327
Hippeastrum Hybrid, lxxv
Hippophae rhamnoides, **142**, 176, 381
"Hive Bee, The," by George A. Carter, reviewed, 44
Hoheria crataegifolius, 235
  glabrata, **F.C.C** 1946...75
  Lyallii, 419, 425
  populnea, 227, lxxviii
"Honey Production in the British Isles," by R. O. B. Manley, reviewed, 44
Horticultural Planting of the Imperial War Graves Commission in N. Europe, by W. F. W. Harding, 104
Hortomone A, Some experiments with, by S. C. Bradford, 395
Hosta plantaginea; lxxiv
    var. japonica, lxxiv
Hunkin, Rt. Rev. J. W. on The Centenary of Three Introductions of Distinction, 485
    A Further Note on the Brothers William and Thomas Lobb, 33
    Tresco under Three Reigns, Part I, 177; Part II, 221
Hydrangea macrophylla (Hortensia), 296, 419, 426
  macrophylla var. Bluewave, 427
    var. Générale Vicomtesse de Vibraye, **A.M.** 1947, lxxix, 426, **436**, 455
    var. macrosepala, 426
  paniculata var. grandiflora, 296
  petiolaris, 163, lxx
  quercifolia, 296
  serrata, 296, 419
    var. Grayswood, 426, **437**
Hymenocallis, 390
  Amancaes, 25
  sp., **394**
Hymenosporum, 236
  flavum, 233
Hypericum crispum, 101
  cuneatum, 14
  Hookerianum, 35
  Leschenaultii, 419, 426
  nanum, 14
  oblongifolium, 35
  patulum, 420
    var. Forrestii, 296, 419
    var. Henryi, 419, 426
  prolificum, 296, 340
  Rowallane Hybrid, vi, 340
  rupestre, 14
  serpyllifolium, 101

Iberis semperflorens, 4, 417
Idesia polycarpa, 234
Ihrig, Herbert G., on Arbutus Menziesii in its native habitat, 159
Ilex, 176
  dipyrena, 190
  Taria, lx
Illicium floridanum, 387
  religiosum (anisatum), 188
Incarvillea lutea, 174
"Introduction to Agricultural Chemistry, An," by N. M. Comber, H. Trefor Jones and J. S. Willcox, reviewed, 291
Iochroma, 236
Ipomaea jasminoides, 184
Iris, A 1, lxviii
  Adonis, lxxiv
  alata, 15
  albicans, 267
  Arab Chief, lxviii
  atrofusca, **61**, 69
  Bacchus, lxviii
  bearded, lxxi
  (d) Blue Pearl, **P.C.** selected for trial, lxx
  Blue Rhythm, selected for trial, lxviii
    Shimmer, lxviii
  (d) Bronze Beauty, **P.C.** selected for trial, lxxi
  Cassandra, lxxiv
  Clarkei, 135, 140
  decora, 133
  Dutch, lxxi
  Edward of Windsor, selected for trial, lxviii
  Elmohr, lxvi
  Garden Glory, selected for trial, lxviii
  Gaynelle, lxvi
  (d) Gold and Silver, **P.C.** selected for trial, lxxi
  graeberiana, lviii
  (d) Harmony, selected for trial, lxxi
  Haynei, 69
  Helen McGregor, selected for trial, lxviii
  hermona, **61**
  histrio var. aintabensis, li
  histrioides, 48
  Hymen, lxxiv
  Kaempferi, Banksian Medal, 216, lxxii
    Argus, lxxiv
  lactea, 175
  (d) Le Mogol, selected for trial, lxxi
  (d) Lemon Queen, **P.C.**, selected for trial, lxxi
  Lynn Langford lxviii
  Mata Hari, selected for trial, lxxi
  (d) Mauve Queen, **P.C.** selected for trial, lxxi
  Nastia, selected for trial, lxviii
  nazarena, 15
  nigricans, 13
  Oncobreds, lxvi
  palaestina, 15
  Priscilla, selected for trial, lxvi
  pesendacorus, 216
Iris Radiant, lxvi
  Red Gleam, lxvi
  reticulata, Banksian Medal, 48, l
    var. Aurora, 48
    var. Cantab, 48
    var. Royal Blue, 48
  (d) Saxe Blue, selected for trial, lxxi
  Seedling CA/1, lxviii
    No. 130, lxviii
  Tobacco Road, selected for trial, lxviii
  unguicularis, 3, 47, 417
  verna, 387
  versicolor, 216
  White Wedgwood, selected for trial, lxvi
Isoplexus canariensis, 232
Ixiolirion montanum, 70

Jacobinia pauciflora, 467
Jasminum angulare, 230
  floribundum, 230
  officinalis, 4
  polyanthum, 3
Jenkinson, R. C., on Rosa Ecae, **357**, 371
Johnson, A. T., on Cistus and frost, 248
    on Epimedium pubigerum, 287
    on Geranium Wallichianum Buxton's Variety, 401
Juglans californica, 269
  Chaberte, 272
    nuts of, **275**
  Champion of Ixworth, 272
  Excelsior of Taynton, 272
  Fertilis, 272
  Franquette, 272
    nuts of, **275**
  Glady, 272
  Lady Irene, 272
  Leeds Castle, 272
  Leib Mayette, 272
  Mayette, 272
    nuts of, **275**
  Meylanaise, 272
  nigra, 269, 273
  Northdown Clawnut, 272
    Clawnut, nuts of, **275**
  Paradox, 269
  Patching, 272
  regia, 269
  Royal, 269
  San Jose Mayette, 272
  Secrett, 272
    nuts, of, **275**
  Stutton Seedling, 272, **275**
  Treyve, 272
Juniperus, 176
  Cedrus, 238
  chinensis, var. aurea, 239
    var. Phitziriana, 109
  Coxii, 238, 240
  excelsa, 14
  Pseudosabina, i
  rigida, i
  Sabina, 109
  Wallichiana, 238

Kalmia, 10
Kennedia, alba, 188
Kigelia pinnata, 29
Kniphofia, Bee's Lemon, selected for trial, ii
  comosa, **315**, 334
  Galpinii, vi, **315**, 334
  insignis, 334
  minima, 334
  Nelsonii, 334
  Northiae, 236
  pauciflora, 334
  rufa, 334
  Snowdenii, **315**, 334
Kniphofias, Some Small-growing, 334
Koelreuteria paniculata, lxxviii
Kunzea, ambigua, 221
  peduncularis, 232

Lachenalia versicolor, 188
Laelia albida, 87
  anceps, 87
  autumnalis, 87
  Gouldiana, 87
  harpophylla, xlvii
Laeliocattleya Anaconda Silver Lindley medal, lxiv
  × Derrynane var. Comet, **A.M.** 1946, vi, 121
  Desmond Sander, **P.C.**, 1
  × Eastern Queen, **A.M.** 1946...121
  × Fiesta, **A.M.** 1946, iii, 122
  Gaillard, xlviii
  × Golden Ray, **A.M.** 1946...122
  Jervis Bay var. Our King, **A.M.** 1947, lxiv, 404
  Michael Westonbirt var. **F.C.C.** 1946, xxxi, 122
  × Oriental Prince var. Eastern Queen, **A.M.** 1946...122
  Princess Ishtar var. Mary, **A.M.** 1947, lxxvi, 455
  Schroederae, Cultural Commendation, liv
  Talana, **A.M.** 1947, lxi, 404
" La Forme des Végétaux et le Milieu," by R. Combes, reviewed, 458
Lagerstroemia indica, 28
Lagunaria, 236
  Patersonii, 232
Lantana camara, 101
Lapageria rosea, 35, 186, 236, 485, 486
Lapeyrousia cruenta, 227
Larches at Dawyck, **8**
Larix, 175
  Griffithiana, 133, 176
Laurelia novae-zealandiae, 234
Laurus Camphora (Cinnanomum Camphora), 185
  nobilis, 101
Leontopodium himalayanum, 135
  Jacotianum var. caespitosum, 144
Leptodermis, 172
Leptospermum bullatum, 184, 190
  laevigatum, 223
  lanigerum, 234
  scoparium var. Nicholsii, 191
Lettuce, 95, 96, 97
  Improved Trocadero, 97
  May King, 97, **101**
    Queen, 97
  Winter Victor, 97
Leucadendron argenteum, 183, 221
Leucojum vernum, 48, liv
  vernum var. carpathicum, 48, lv
    var. Vagneri, 48
Leucospermum Bolusii, 229
Leucothoe Davisiae, lxviii
Lewisia brachycalyx, 128
  Heckneri, 128, 215
  pygmaea, 128
  Trevosia, **P.C.**, lxvi
  Tweedyi, Cultural Commendation, 128, lxiii
  Week's Seedling, **A.M.** 1947, lxxiv, 455
Liatris callilepis Flora Medal, lxxvii, lxxviii
Libocedrus chilensis, 240
  decurrens, 7, **235**, 239, 240
Libonia floribunda, 81
" Lilies for Every Garden," by Isabella Preston, reviewed, 375
" Lilies for the Beginner," by G. M. Taylor, reviewed, 492
" Lilies for Garden and Greenhouse," by D T Macfie, reviewed, 492
Lilium auratum, 231
  Brenda Watts, lxx
  canadense, 390
  candidum, 101, **274**, 284
  Catesbaei, 391
    Longii, 391
  concolor, 487
  Dunkirk, lxiv
  formosanum, Cultural Commendation, lxxxiv
  George C Creelman, 375
  giganteum, 9, 10, **22**, 260
  Grayii, 390
  × Horsfordii, lxxx
  iridollae, 382, 391
  Kulshan, **A.M.** 1946...122
  Lilian Cummings, 375
  Lyla McCann, 375
  Michauxii, 391, 395
  michiganense, **P.C.**, lxxvii
  Muriel Condie, lxiv
  pardalinum, **A.G.M.** 1947...260, 395, 399
  philadelphicum, 390
  pyrenaicum, **A.M.** 1947, lxviii, 404
  rubellum, 216, 260
  Scotsman, lxiv
  Scottiae Hybrid, **A.M.** 1947...404, lxiv
  speciosum, 231
  superbum, 382, 390, 391, **394**
  Szovitsianum, 216
  umbellatum, 216
  Violet M. Constable, lxiv
Limonium cancellatum, iii
  (Statice) cosyrense, 340
    ornatum, 296
Linum aretioides, 14, **22**, 46
  iberidifolium × flavum, **P.C.**, lxvi

Linum mucronatum, 103
  pubescens, 103
Lippia citriodora, 227
Liquidamber styraciflua, 380, 417
Lithospermum, 185
  carolinensis, 390
  diffusum (prostratum), 164
    (prostratum) Grace Ward, 164, 424
      Heavenly Blue, 164
  rosmarinifolium, 3, 81, 381, 416, 467
Litsea, 176
Loasa, 24
Lomatogonium oreocharis, 169, 173
Lonicera, 141
  etrusca, 102, 227
  fragrantissima, 3
  Hildebrandiana, 235, 261
  Scottiae, **A.M.**, lxiv, 404
  tatarica sibirica, **A.M.**, 1947, lxiv, 404
Loropetalum chinense, 47
Luculia gratissima, 232
  Pinceana, 47, 233
Lupins, Bud and flower dropping in, by L. G. G. Warne, 193
Lupinus Bishopsgate, 194
  George Russell, 194
  Josephine, 194
  Lady Beatrix Stanley, 194
  Lady Miles Mitchell, 194
  Maud Tippetts, 194
  Mrs. Micklethwaite, 194
  nanus, 215
  Nellie Allen, 194
  Patricia of York, 194
  Phyllis Cooper, 194
  polyphyllus, 193
  terminus, 101
Lycaste aromatica, 87
  cruenta, 87
  Deppei, 87
  fulvescens, 87
  gigantea, 87
  hybrids, 87
  macrobulbon, 87
  macrophylla, 87
  Skinneri, 87
  Sunrise var. Fiona, **A.M.** 1947...l, 290
Lychnis chalcedonica, **A.G.M.** 1946, **395**, 400
  dioica plena Emneth variety, lxviii
Lysichiton americanum, 11, 128, lx
  camtschatcense, **A.M.** 1947...128, lx, 404
Lysimachia ephemerum, **A.M.**, lxxviii
Lysionotus pauciflorus, Cultural Commendation, lxxviii

Macrosiphum solanifolii, 370
Macrotomia echioides, 128
Magnolia acuminata, 335
  Ashei, 387, **394**
  Campbellii, 131, 335
  conspicua, 335
  cordata, 387
  Dawsoniana, lx
  denudata, 420
  Fraseri, 387
Magnolia grandiflora, 30, 467
  Lennei, 164
  mollicomata, 420
    Lanarth, **F.C.C.** 1947, lvi, 290
  obovata, 424
  Sargentiana var. rubusta, **F.C.C.** 1947, lvi, 290
  Sieboldii, 216, 422, 424
  sinensis, lxiv, 422
  Soulangeana, 128, 129, 420
  Sprengeri diva Seedling, **A.M.** 1947, lx, 290
  stellata, 128
  Veitchii, 315, 335, lxxxv
  virginiana, 216, 260
  Watsonii, 216, 424
  Wilsonii, 164, lxxxv
Mahonia Aquifolium, 159
  japonica, 47, lxx, 467
Maidenhair Tree, The (Ginkgo biloba) by H. Prideaux-Brune, 446
Maize, Country Gentleman, 200
  cultivation in England, Short nights an unappreciated hindrance to, by B. C. Sharman, 195
  Gehu, 200
  Golden Bantam, 199
    Cross, 200, 201
  John Innes, 200, 201
  North Western Red Dent, 200
  9 × M 13...200
  × 255...200
  × 275...200
Malus, 340
  baccata, 133, 381
    var. mandschurica, xxix
  Eleyi, 164
  floribunda, 108, 422
  hupehensis, (theifera), 165
  Lemoinei, 164
  magdeburgensis, 164
  Niedzwetzkyana, 381
  prunifolia, var. Rinki, iv
  purpurea, 108
  Ringo, iii, iv
Malva umbellata, 341
Malvastrum capense, 185
  puniceum, 230
Mandevilla suaveolens, 181, 227
Mandgragora Hausknechtii, **23**
Marrow, 96, 98
  Custard, 98
  Foxcombe Snowball, vii
  Green Bush, 98
  Stonor's Universal, **101**
  Table Dainty, 98
Martin, D., Eucalyptus in England, 453
Masdevallia deorsa, **100**
Masters Memorial Lectures, 1947...313, 342
Maxillaria grandiflora venusta, 87
  Huebschii, 87
  picta, 87
  Sanderiana, 87
Meconopsis, 130, 138, 172, 310, 311
  argemonantha, 167, 173
    var. genuina, 173
    var. lutea, **142**, 167, **186**

Meconopsis bella, **143**, 173, 175, 176
  betonicifolia, 134
    (Baileyi), 164
  Florindae, 167
  from the vicinity of Lhasa, by George Taylor, 309
  grandis, 176
  Harleyana, 139, 140, 141, **143**, 168
  horridula, 132, 140, 141, **142**, 174, 310, 311, **314**
    var. lutea, **143**, 168
  impedita, 140, 141, **143**, 168
  integrifolia, 139, 140, 142, **143**, 168, 312, **314**
  lyrata, 142, **186**
  paniculata, 132, 173
  quintuplinervia, 216
  rudis, 132
  Sherriffii, **143**, 175
  simplicifolia, 133 136, 139, 140 **142**, **143**, 168, 176
  speciosa, 136, 140 141, 142, **143**
  torquata, 310, 311, **314**
  villosa, 131
Medicago, 236
  arborea, 232
Melaleuca armillaris, 229
  hypericifolia, 187
  linariifolia, 221, 233
  sp., 223
  taxifolia, 188
Melanthium virginicum, 390
Melianthus major, 232
Melicope ternata, 231
Melicytus ramiflorus, 234
Melon Dutch Net, 99
  Rock Prescott, 99, **101**
  Tiger, 99
Melons, 96, 98
Menyanthes trifoliata, 142
Menziesia lasiophylla, lxiv
" Merrilleana, a Selection from the General Writings of Elmer Drew Merrill," reviewed, 256
Meryta Sinclairi, 233, **234**
Mesembryanthemum aurantiacum, 189
  Brownii, 230
  coccinea, 230
  Framesii, 230
  hispidum, 228
  Mahoni, 228
  Peersii, 228
  productum, 189
  sp., 223
  speciosum, 228, 230
  splendens, 228, 230
  tricolor, 188
Metrosideros, 236
  collina, 221
  diffusa, 191, 223, 226
  floribunda, 181
  lucida, 190, 223, 229
  robusta, 188, 223, 225, 226, 232, 233
  tomentosa, **187**, 223, 226, 229, **234**
Michelia fuscata, 232
  repens, lxix
Miltonia × Rubicon, **A.M.** 1946...122
  vexillaria, 87
Mimulus cardinalis, 287
  Langsdorffii, 287
  luteus, 287
  moschatus, 373
    The Lost Scent of, 285, 286, 287, 373
Mitraria coccinea, 227
Moraea, 188
  Robinsoniana, 235
  spathacea, **A.G.M.** 1946...**395**, 400
" More Labour Saving Gardens," by Hilda M. Coley, reviewed, 460
Muehlenbeckia complexa, 233
Musa Ensete, **234**
Muscari armeniacum, lix
Musschia Wollastoni, 232
Myoporum laetum, 188, 229
Myosurus minimus, lxvii
Myrica cerefara, 241
  Faya, 231
Myricaria davurica, 135
  Wardii, 134
Myristica, 188
Myrsine africana, 234
  tenuifolium, 188
  Urvillei, 234
Myrtus bullata, 230
  communis var. tarentina, viii
  Ugni, 35. 231

Narcissus Amberley, **P.C.**, lxii
  Angmering, selected for trial, lxii
  Armada, **F.C.C.** 1947...405, xlix, lvii
  asturiensis, 48, 80
  Bann, lxii
  Bartley, **A.M.*** 1946...252
  Bizerta, **A.M.** 1947, lxii, 405
  Bodilly, **A.M.*** 1946...252
  Boswen, **A.M.*** 1946...252
  Bulbocodium, 128, lix
  calcicola, 48, 80
  Carbineer, **H.C.*** 1946...252
  Cragford, **F.C.C** 1947, xlix, 291
  Cricket, lxii
  Crock of Gold, **A.M.** 1947, lxii, 405
  Crocus, **H.C.*** 1946...252
  cyclamineus, 47, 80
  dubius, 3
  Fairy Wings, Banksian Medal, lv
  Fingal, **A.M.*** 1946...253
  Frigid, **A.M.** 1947, lxv, 405
  Garrick, lix
  Garron, **A.M.*** 1946...253
  Glenravel, **H.C.*** 1946...253
  Goldcourt, **F.C.C.** 1947, lxii, 405
  Golden Torch, **A.M.** 1947, liv, 291
  Goring, selected for trial, lvii
  Kanchenjunga, lxii
  Kingscourt, **F.C.C.** lvii
  Krakatoa, **F.C.C.** lviii
  Leslie Hulbert, **A.M.*** 1946...253
  Mahmoud, **A.M.** 1947, lxii, 405
  Milanion, **P.C.**, lxii
  minor, 80
  Nairobi, lxii
  nanus, 48
  Orange Bird, **H.C.*** 1946...253

Narcissus Pacific, **A.M.*** 1946...253
  Panizzianus, 467
  Parkmore, **A.M.** 1947, lxii, 405
  Patching, selected for trial, lxii
  poeticus var. Pheasant's Eye, 184
  princeps, 184
  pseudo-narcissus, 184
   obvallaris, 184
  Rewa, **A.M.** *1946...253
  Rippling Waters, **A.M.*** 1946...253
  Rouge, selected for trial, lxii
  Rubra, lv
  Scilly White, 183, 184
  Soleil d'Or, 183, 184
  Spitzbergen, **A.M.** 1947, lix, 406
  Statue, **P.C.**, lvii, **A.M.** 1947...406, **A.M.**, lix
  Tazetta, 70
  triandrus, lix
  Trousseau, **F.C.C.** 1947, lvii, 406
  Watieri, 80
  Zeeland, **H.C.*** 1946...254
Nectaberry, selected for trial, lxxiv
Neillia ribesioides, lxviii
Nelumbo lutea, 283, 284
  nucifera, 283, 284
Neomoorea irrorata, Cultural Commendation, li
Nepeta curviflora, 102
  Govaniana, lxxvii
Nerine Bowdeni, 380
  filifolia, 416
  Henry Elwes, **P.C.**, v
  sarniensis, 179
Nerium, Oleander, 102
Nertera depressa, 296
New and Noteworthy Plants, 391
Nicotiana glauca, 103
Nigella, 99
Nomocharis, 135
" Norfolk Notebook," by Lilias Rider Haggard, reviewed, 124
Notelaea excelsa, 231
Notes from Fellows, 32, 73, 110, 159, 248, 285, 334, 371, 400, 450, 485
Notholaena, 240
Notholirion hyacinthinum, 138, 166, 170
Nothopanax Davisii, 233
Nuttallia cerasiformis, 81
Nyssa sylvatica, 457
Nymphaea caerulea, 283

Ochagavia Lindleyana, lxxxiv
" Occasional Publication on Scientific Horticulture," edited by R. T. Pearl, reviewed, 412
Odontioda Dovedale, **A.M.** 1947, lxiv, 406
  × Eudacis, **A.M.** 1946, xxix, 122
Odontoglossum apterum, 87
  bervantessii, 87
  caudatum, 87
  citrosmum, 87
  crispum, 84
  grande, 87
  Insleayi, 87
Odontoglossum Mary, **A.M.** 1947, lxi, 406
  Rossi, 87
  Thecla, 100
  Uroskinneri, 87
  Williamsianum, 87
Odontonia Amphia var. Vanguard, **F.C.C.** 1947, lxiv, 406
  Cephelia, **A.M.** 1947, liv, 291
" Old Fashioned Flowers," by George M. Taylor, reviewed, 292
Olearia angustifolia, 235
  avicenniaefolia, 235
  chathamica, 191, 225
  dentata, 183, 188
  erubescens, 235
  Fosteri, 185, 229
  furfuracaea, 224
  nummularifolia, 235
  semidentata, 190, 191, 225
  Solandri, 234
  sp., 223
  stellulata ×, 235
  Traversii, 234
Omphalodes Luciliae, 13
  nitida, 128
Oncidium cheirophorum, 87
  crispum, 87
  curtum, 87
  Forbesii, 87
  incurvum, 87
  Lanceanum, **A.M.** viii
   St. Albans var. **A.M.** 1946...122
  leucochilum, 87
  loxense, 84
  macranthum, 84
  Marshallianum, 87
  Martinii, 87
  Papilio, liv
  serratum, 84
  splendidum, 85
  superbiens, 84
  tigrinum, 87
Onion Ailsa Craig Select, 120
  Ailsa Craig, Watkin & Simpson's Selection, **A.M.*** 1946...120
  A1 Select, 119
  Bedfordshire Champion, 119
  Best of All, **A.M.*** 1946...119
  Brown Globe, 119
  Bunting's Exhibition, 119
  Cranston's Excelsior Improved, 120
  Giant Zittau, **A.M.*** 1946...19
   Watkin & Simpson's Selection, **A.M.*** 1946...119
  Golden Ball, **A.M.*** 1946...120
  Market Favourite, 119
  New Oval, 120
  Prizewinner, 120
  Reading Improved, 119
  Rousham Park Hero, Watkin & Simpson's Selection, **A.M.*** 1946, 119
  Up-to-Date, 120
  Victory, **H.C.*** 1946...120
  Walker's Exhibition Improved, 119
  Wroxton, 119
  Springsown at Wisley, 1946...119

- Onobrychis cornuta, 14
- Ononis antiquorum, 101
  - pubescens, 103
- Opuntia, 102
  - floccosa, 30
- Orange Jaffa, 345
  - Washington Navel, 316, 345
- Orchids for Amateurs, by E. Cooper, 83
- Orchis foliosa, 260
  - maculata, 260
- Oreodoxa regia, 30
- Ornithogalum arabicum, 70, 188
  - narbonense, 70
- Osmanthus Delavayi, 81
- Ourisia microphylla, **A.M.** 1946...75
- "Over to Flowers," by M. James, reviewed, 291
- Ovis ammon, 176
- Oxalis Bourei, 381
  - crassifolia, 186
- Oxydendron arboreum, 417
- Oxypetalum caeruleum, lxx
- Oxytropis sericopetala, 134
- Ozothamnus rosmarinifolius, 232

- Paeonia × Argosy, 394
  - Cambessedesii, 81
  - Clusii, 16, 81
  - Delavayi, 395, lxxiv
  - × Espérance, 394
  - lutea, 134, 175, 394, 395, **396**
  - obovata, lxxxii
    - var. Willmottiae, lxxxii
  - Orion, **F.C.C.** 1946...75
  - Study of the genus, 81
  - suffruticosa, 424
- Palestine, The Flowering Shrubs of, by Capt. Eric Hardy, 100
- Pancratium maritimum, 70
  - Sickenbergeri, 13
- Papaver alpinum, 216
- Paraquilegia anemonoides, 134, **142**
- Parrotia persica, 380, 417
- Patrons, Council and Officers 1947, xxxiii
- Paulownia imperialis, 30, 109, 188
- Pea Culinary, 95, 97
  - Culinary, Aurora, 38
    - British Lion, **A.M.*** 1946...38
    - Cloche Wonder, 38
    - Delicious, 39
    - Early Bird, 38
    - Early Dwarf Hybrid, 38
      - Freezer No. 1, **A.M.*** 1946...39
        - No. 2, **F.C.C.*** 1946...39
    - Eclipse, 38
    - Emerald Podded, 38
    - Essex Star, 38
    - Evesham No. 1, 38
    - Exquisite, 37, 38
    - Feltham Advance, **F.C.C.*** 1946, 38
      - First, **F.C.C.*** 1946...37
      - Forward, **F.C.C.*** 1946...38
      - Radar, **A.M.*** 1946...38
    - Foremost, 38
    - Gradus, 37, 39
- Pea Culinary Kelvedon Wonder, 37, 38
    - Laxton's Progress, 37
      - Superb, 97, **101**
    - Little Marvel, 37
        - Improved, 38
    - Maid of Kent, 38
    - Meteor, 37, 38, 97
    - Morse's Progress, 38
    - No. 61...38
    - No. 72...38
    - Onward, 37, 38
    - Primo, 37
    - Resistant Hundredfold, 38
    - Timperley White, 38
    - Tom Clucas, 38
- Peach Diana Grace, i
- "Peach Orchards in England," by Justin Brooke, reviewed, 375
- Peach seedling, lxxvi
  - Suncroft, lxxxii
- Pear Beurré Bedford, 316, 347
    - Superfin, 146
  - Conference, 49, 146, 475
  - Doyenné du Comice, 49, 347, 475
  - Honey Pear, i
  - Laxton's Superb, 482
  - William's Bon Chrétien, 49, 147, 475, 482
- Pears on Quince, **143**
      - at East Malling, **143**
  - at Wagnonville, **143**
- Pelargonium, 236, 306
  - macranthum, 187
  - Monsieur Norin, 230
  - Moore's Victory, 227
  - Pretty Polly, 230
  - Prince of Orange, 187
  - Rollisson's Unique, 187, 228
  - Shrubland Pet, 187
  - sp., 223
- Penstemon barbatus, 250
  - cobaea, 389, **395**
  - connatifolius, 389
  - digitalis, 389
  - Palmeri, 389
  - Torreyi, 389
  - triflorus, 389
- Pentapterygium rugosum × serpens, lxiv
- Pepper, Sweet, 96
- Pernettya mucronata, 48, 380
- Perowskia atriplicifolia, 295
- Phalaenopsis × Katherine Seigwart var. Etna, **A.M.** 1946...122
  - Marmouset, **A.M** 1947, xlviii, 374
- Phaseolus vulgaris, 193
- Philadelphus Beauclerk, **A.M.** 1947, lxxiii, 455
  - Belle Etoile, 425
  - coronarius, 192
  - Delavayi, 426
  - Lemoinei, 107, 192
    - Erectus, **A.G.M.** 1946...192
  - microphyllus, 192
  - Unique, **P.C.** lxx
  - Virginal, 425
  - White Cockade, lxxiii
- Philesia buxifolia, 485

Phillostachys aurea, 235
Phillyera media, 101
Phlomis rotata, 174
  Russellianus, lxx
  viscosa, 101
Phlox Buckleyi, 386
  carolina gloriosa, 386
    gloriosa candida, 386
      lavendula, 386
  divaricata, 386, **395**
    Laphami, 386
  mesoleuca, lxvi
  nivalis, 388, **394**
  stolonifera Blue Ridge, 386
Phoenix canariensis, 225, 226, **234**, 236
"*p*H and Plants," by J. Small, reviewed, 292
Phormium tenax, 181, 186, 224
Phygelius capensis, 188
Phyllocladus trichomanoides, 235, 239, 240
Phyllodoce caerulea, Cultural Commendation, viii, 136
Physostegia virginiana var. Vivid, 341, 381
Phyteuma comosum, 215
Picea, 143, 166, 167, 175
  asperata, 8, 238
  Breweriana, 240
  hondoensis, 239
  likiangensis, 133, 174
  Morinda, 8
  morindoides, 238
  Omorika, 238
  orientalis, 7, 8, 239
  pungens glauca, 238
    var. Kosteriana, 468
  rubra, 238
  sitchensis, 7
" Picture Primer of Indoor Gardening, The," by Margaret O. Goldsmith, reviewed, 491
Pieris floribunda, 80
  Forrestii, 423
  japonica, 47, 80
  taiwanensis, 80
Pilgerodendron uviferum, 239
Pink Allwoodii Alice, 208
    Amy, 208
    Betty, 208
    Bridget, 208
    Denny, **A.M.*** 1946...208
    Esther, 209
    Freda, **H.C.*** 1946...208
    Gloria, 209
    Harold, 208
    Ian, 209
    James, 208
    Jean, 208
    Joan, 209
    Mary, 209
    Molly, 209
    Monty, 208
    Paddington, **A.M.*** 1946...209
    Pamela, 209
    Peter, 208
    Peggie, **A.M.*** 1946...209
    Richard, 209
Pink Allwoodii Robert, 209
    Robin, 208
    Ruth, 209
    Susan, 209
    Thomas, 209
    Waved Flowered, 209
    Winston, 209
  Bat's Double Red, 23
    Pink, 23
    White, 23
  Beverley, 23
  Chelsea, 22
  Cockenzie, 22
  Cuckfield, 209
  Dad's Favourite, 208
  Damask, 19, 21
  Delmonden Fairy, 23
  Double Ruby, 23
  Dusky, 208
  Earl of Essex, 208
  Frimbriata, 208
  Her Majesty, 208
  Inchmery, **A.M.*** 1946...22, 208
  Little Old Lady, 22
  Mrs. Sinkins, 22, 208
  Montrose, 22
  Murray's Laced Pink, 208
  Musgrave, 22, 74
  Musgrave's Pink, **A.M.*** 1946...208
  Newhaven, 208
  Old Fringed, 208
    Man's Head, 19, 21
  Ovingdean, **A.M.*** 1946...208
  Paddington Cob, 75
  Painted Lady, 20
  Pheasant's Eye, 21, 74, 75
  Princess Christian, 208
  Roi de Mai, 209
  Ruth Landsell, 208
  Sam Barlow, **A.M.*** 1946...208
  Snowdrift, 208
  Village Pinks, 209
  White Ladies, 208
    Shock, 19, 21
Pinks, Garden, at Wisley, 1946...207
Pinus austriaca, 7, 8
  canariensis, 229, 238
  Cembra, 7
  excelsa, lxxi
  halepensis, 8, 101
  Hartwegii, 239
  insignis, 178, 221
  Lambertiana, 8
  leucodermis, 238
  Lindleyi, 239
  Montezumae, **235**, 238, 239, 240
  palustris, 240
  parviflora, 239
  patula, 239
  Pinea, 8
  ponderosa, 7, 8
  Pseudo-Strobus, 240
  radiata, 223
    (insignis), 184
  Sabiniana, 8
  tabuliformis, 133
  Wallichiana, 176
Piptanthus napaulensis, 133

Pistacia lentiscus, 100
  palaestina, 100
Pitfalls of the Amateur Fruit Grower, by Raymond Bush, 473
Pittosporum bicolor, 234
  Colensoi, 190
  crassifolium, 187, 188
  Dallii, 235
  eugenioides, 234
  Fairchildii, 234
  Kirkii, 235
  paticulum, 236, lxiv
  Ralphii, 231
  sp., 223
  tenuifolium, 234
  Tobira, 184, 190, 236
  umbellatum, 236
  undulatum, 185, 186, 232
Pityogramma, 240
Plant collecting in South-Eastern Tibet, by George Taylor, 130, **142**, 166, **186**
  collectors in China, **101**
" Plant Life of the Pacific World," by Elmer D. Merrill, reviewed, 376
" Plant Names Simplified: their Pronounciation, Derivation and Meaning," by A. T. Johnson and H. A. Smith, reviewed, 489
" Planting for Plenty," by R. C McMillan, reviewed, 491
Plants and experiences in the Eastern Mediterranean, by P. H. Davis, 13
Platanus occidentalis, 30
Pleurogyne, 142
Plum Belle de Louvain, 478
  Blue Rock, 316
  Rock Cross Myrobolan, 345
  Coe's Golden Drop, 375
  Invicta, lxxxii
  Red Myrobalan, 316
  Victoria, 475
  Victory Victoria, lxxxii
Plumbago capensis, 261, 341
Podocarpus chilinus, 239
  nubigena, 239
  Totara, 234
Podophyllum emodi, 133
Pollen, staining of, 301
Polyanthus, 96
  Delmonden Mauve, lx
  seedling, lxiv
Polygala myrtifolia, 231, 236
  pauciflora, lxvi
  Vayredae, 164
Polygonum, 140
  affine, 340, 417
  capitatum, 340
  complexum, 188
  paniculatum, 260
  Reynoutria, 340
Pomaderris elliptica, 3
  lanigera, 188
" Pomologi, Beskrivningar over de viktigaste i Sverige odlade fruktsorterna," by Carl G. Dahl, reviewed, 410
Poncirus trifoliata (Aegle sepiaria), 417
Pontederia cordata, 260
Populus generosa, lxxxv
  Maximowiczii, lxxxv
  robusta, lxxxv
  serotina, 457
  trichocarpa, 8
" Posy of Wildflowers, A," by Victor Bonham-Carter, reviewed, 460
Potato Crawley Beauty, 356
  Medaille d'or, 356
Potentilla fruticosa, 425
  fruticosa var. grandiflora, 139, **142**
  rupestris, lxvii
Poterium spinosum, 15, **28**
Potinaria × Medea, **A.M.** 1946, xxix, 123
" Practical Course in Agricultural Chemistry," by F. Knowles and J. E. Watkins, reviewed, 490
" Practical Soil Sterilisation with special reference to glasshouse crops," Bull. No. 22, Min. of Agric., reviewed, 459
Pratt, A. E., in Chinese Dress, **101**
Prideaux-Brune, H on The Maidenhair Tree, 446
Primula, 240, 241
  advena, 168
  Aliceae, 144, **187**
  Allionii, 80, 243, lvi
    alba, 80
  alpicola, 135
    var. luna, 140
    var. violacea, 243, 245
    var. violacea, flowers of, **235**
  amabilis, 168
  aureata, **A.M.** 1947, lviii, 374
  auricula, 241, 244
    var. Celtic King, lxiii
    var. decora, lxiii
  Baileyana, 135, 139, 142, 144, 168
  Beesiana, 243
  bellidifolia, 134, 144, 168
  Berrywell, lxxiii
  bracteosa, lii
  Bulleyana, 242, 243
  burmanica, 243
  calliantha, 131, 136
  capitata, 170, 242, 243
  Caveana, 172
  Cawdoriana, 139, 142, 143
  chamaethauma, 136
  chionota, 131
  chungensis, 243
  Clarkei, 128
  Cockburniana, 110
  concholoba, 136
  cortusoides, 243
  crispata, 168
  denticulata, 241, 242, 243
    var. cachemeriana, 241
    Cambria Strain, selected for trial, lx
    Leaf of, **235**
  Dickieana, 136
  dryadifolia, 142, 172
  falcifolia, 131
  Florindae, vi, 242, 243, 244, 260

Primula Forrestii, 243
  frondosa, 243
    Leaf of, **235**
  gemmifera, 144
  Genestieriana, 136
  glabra, 136, 173
  gracilipes, 131
  helodoxa, 216, 243
  hyacinthina, 176
  imperialis, var. gracilis, 243
  Jaffreyana, 138, 174, 175, **186**, 243
  japonica, 216, 243
  Jonardunii, 136
  Juliae, 128
  Juliet, liii
  latisecta, 170
  Listeri, 131
  Littledalei, 144, 168, **186**
  malacoides, 243
    Attraction, selected for trial, l
    Grandeur, selected for trial, l
    Princess, selected for trial, l
  marginata, 80, 243, 244, **235**
  Maximowiczii, 143
  minor, 136
  Mooreana, 243
  obconica, Banksian Medal, Flora Medal, 4, xxviii, 243, lxix
    Giant Hybrids, Silver Flora Medal, xlvii
  Palinuri, 80
  pedemontana, 243
  pubescens var. Rufus, lviii
  pulchelloides, 243
  pulverulenta, 216, 241, 243
  × Red Hugh, 216
  rhodochroa, 136, 144
    var. meiotera, 142
  rigida, 312
  rosea, 128
    grandiflora, Cultural Commendation, lvi
  Roylei, 132
  × scapeosa, **A.M.** 1947, lii, 374
  secundiflora, 244, 312
  Sherriffae, 243, 244
  Sieboldii Perfield Gem, lxiv
  sikkimensis, 243
    var. pudibunda, 136
  sinensis, 243
    (Giant) Crimson Glow, selected for trial, xlvii
    stellata Crimson Star, selected for trial, xlvii
      Enchantress, selected for trial, xlvii
      Fire King, selected for trial, l
      (Giant) Meteor, selected for trial, xlvii
        Salmon King, selected for trial, xlvii
        Salmon Queen, selected for trial, xlvii
        Vanguard, selected for trial, xlvii
  sinoplantaginea, 168
  sinopurpurea, 139
  Souliei, 144
Primula sp., **A.M.**, lviii
  Species of, The Secretion of Farina, by, Walter C. Blasdale, 240
  suffrutescens, 34
  szechuanica, 141, 170
  tenella, 142
  Thorpe Morieux Hybrid, lxiv, lxviii
  tibetica, 175
  Valentiniana, 131
  vernicosa, 136
  verticillata, 243, 244
    leaf of, **235**
  violacea, 135
  viscosa alba, lviii
  Walshii, 144
  Waltonii, 244
  Whitei, 173
  Winteri, 48
  Youngeriana, 168
Primulata marginata × Hyacinthia, lviii
Pristiphora alnivora, lxxiv
"Propagation of Hardy Trees and Shrubs," by G. E. Taylor and F. P. Knight, reviewed, 489
Prostanthera pulchella, 191
Protea latifolia, 236
  mellifera, 234
  neriifolia, 236
  Suzanniae, 236
Prumnopitys elegans, 239
Prunus Avium, lxxi
  Avium var. flore pleno, 108
  cerasifera var. Pissardii 81, 108
  Conradinae var. semiplena, 48
  cyclamina, lx
  glandulosa, 129
    var. sinensis, 129
  Incamvar. Okame, **A.M.** 1947, lvi, 37
  Kanzan, 128
  nana, 129
  Oku-miyako, 128
  Padus, 108
  Persica Palace Peach, **A.M.** 1946, viii, 75
    var. magnifica, 164
  pumila, viii
  Sargentii, 9, 128
  serrulata Asano, lx
    var. Hokusai, 421
    var. Minterne, lxiv
    var. mutabilis, 421
    var. Tai Haku, 421
  subhirtella, 416, **486**
    var. autumnalis, 48
    var. pendula, 128
  Ukon, 128
  yedoensis, 128
Pseudo-larix Kaempferi, 238
Pseudomonas juglandis, 271
Psedudopanax ferox, 234
Psoralea affinis, 190
  pinnata, 188, 229, 235
Pulmonaria angustifolia, 80
Puschkinia scilloides alba, 80
Puya chilensis, 182, 186, **187**, 236
Pyracantha crenulata var. flava, viii
  var. Rogersiana, viii
Pyrethrum, 364
  grandiflorum, 186

Pyrostegia venusta, 28
Pyrus Aria, 108
  Aucuparia, 108
  Maulei (Chaenomeles japonica), 186

Quarrell, C. P., on Continuous Cloche Gardening, 88
Quercus coccifera, 101
  ilex, 178
  incana, 234
  palustris, lxxxv
  Phellos, lxxxv
  semecarpifolia, 133
  × Schochiana, lxxxv

Radish, 95, 97
  French Breakfast, 97
  Short Top Forcing, 97
  Sparkler, 97
Ramondia Nathaliae, 164
Ranunculus acris, lxvii
  asiaticus, 70
  calandrioides, 4
  Kelways Improved Strain, Banksian Medal, lxxv
  montanus, lv
Raphiolepis ovata, 186, 233
"Rapid Tomato Ripening," by L. D. Hills and E. H. Haywood, reviewed, 212
Raspberry Malling G, lxxiv
  Seedling, lxxvi
Rehderodendron macrocarpum, **A.M.** 1947, lxiv, 406
Reseda lutea, 103
Restio subverticillatus, 231
Restrepia maculata, **100**
Retama Rhoetam, **100**
Rhamnus, 172
Rhaphithamnus cyanocarpus, 231
Rheum nobile, 141
Rhododendron aganiphum, 11
  alabamense, 388, 394
  Angelo, **F.C.C.** 1947, lxviii, 406
  anthopogon, 136
  Antonia var. Omega, lxx
  arborescens, 216
  arboreum, 10, 79, 131, 164, 221
  atlanticum, 388
  Aucklandii, 221
  Augustinii, 11, 164
  auriculatum, 260
  austrinum, 388
  azaleoides, 216
  Azor, 11
    var. C. F. Wood, lxv
  Balfourianum, 11
  Blancmange, **A.M.** 1947, lxviii, 407
  Blue Peter, 164
  Borde Hill, 164
  brevistylum, lxx
  × Bric-a-Brac, lxi
  Britannia, 423
  bullatum, 81, lxiii
  Bureavii, 11
  calophytum, 79
Rhododendron campylocarpum, 10, 422
  campylogynum, 142
  canescens, 388
  × Capt. Blood, **A.M.** 1947, lxiii, 407
  catawbiense, 9
  caucasicum, 422
    × ponticum, 9
  Chapmani, 389
  Chrycil, lxi
  × chrysomanicum, **A.M.** lxi
  ciliicalyx 81
  cinnabarinum 11, 173
  Clementinae, 11
  (a) coccinea speciosa, 424
  (a) Cornish Glow, **A.M.**, lxv
  Cremorne, **A.M.** 1947, lxiii, 407
  cumberlandense, 389
  Dalhousiae, 223
  Degronianum, 392, 393
  Delavayi, 10
  dignabile, 136
  discolor, 10, 11, 419
  × Dr. Stocker, 422
  elaeagnoides, 144
  Elliottii × Shilsoni, 422
  Falconeri, 10, 234
  Fargesii, 79
  ferrugineum, 216
    album, 216
  fictolacteum, 10, 215
  Fine Feathers, lxi
  flavorufum, 11
  Forrestii, 136
  fragariflorum, 136
  fulgens, 10
  Gladys var. Letty Edwards, **A.M.*** 1946...254
  Gladsy Rillstone, lxx
  × Golden Oriole, **A.M.**, lxi
  Goldfinch, lxv
  Griersonianum, 11, 419
  Griffithianum, 422
  haematodes, 10
  heliolepis, 11
  hippophaeoides pink form, lxiii
  Hodgsonii, 10
  Icarus, **A.M.**, lxv
    var. Organdie, **A.M.**, lxv
  inaequale, **A.M.** 1947, lxiii, 407
  indicum, 419, 424
  Indiana, lxx
  inopinum, 11
  insigne, 10
  Isabel, lxviii
  J. J. de Vink, **A.M.*** 1946...254
  Jutland, **A.M.** 1947, lxx, lxviii, 407
  Kharkov, **A.M.** lxv
  Kilimanjaro, **F.C.C.** 1947, lxviii, 408
  (a) Knap Hill Hybrid, 423
  lacteum, 11, 421
  Lady Chamberlain var. Golden Queen, **F.C.C**, lxv
  laudandum, 139
  lepidotum, i, 141, 173
  × Loderi, 422
  Lolanda, lxv
  longisquamatum, 10
  lutescens, 79

Rhododendron Macabeanum, lxiii
  macrophyllum (californicum), 159
  Maddenii f. calophyllum, lxviii
  Makinoi, 392
  Marchand, lxiii
  Marinus Koster, 164
  maximum, 9, 11
  Metternichii, 392, 393
  minus, 389
  Mrs. Furnival, 164
  neriiflorum, 10
  Nobleanum, 421
  obtusum, 10, 421
    var. Kaempferi f. Daimio, 419, **436**
  occidentale, 160
  Opaline, lxx
  Ophelia, lxx
  oreodoxa, 10
  paludosum, 136
  Peter Koster, **A.M.*** 1946...254
  planetum, 10, 127
  Polar Bear, **F.C.C.** 1946...123
  ponticum, 9, 470
  Portia, **F.C.C.**, lxi
  praecox, 214
  prunifolium, 389
    × occidentale, lxxvii
  pumilum, 136
  quinquefolium, 10
  racemosum, 127, 128
  reticulatum, 10
  riparium, 136
  × Romany Chal, 426
  (a) roseum, lxv, 388
  rubiginosum, 127
  St. George, **A.M.*** 1946...254
  sanguineum, 10
  Sargentianum, 10
  seinghkuense, lxiii
  setosum, i
  Snow Queen, **A.M.*** 1946...254
  Souliei, 10, **22**
  speciosum, 383, 388
  Stewartianum, 127, lxi
  sutchuenense, 79
  taliense, 11
  telmateium, 133, 138
  Thomsonii, 10, 79
  Tortoiseshell var. Wonder, **A.M.**, lxv
  triflorum, 11, 134
  tsariense, 136
  Vaseyi, 8, 10
  Veitchianum, 221, 223
  vellereum, 134
  vernicosum, 10
  Victory, lxv
  viscosum, 216
  Wallichii, 176
  Wardii, 136
  Weldianum, 11
  White Swan, 164
  Wightii, 10
  Wiltonii, 11
  yakusimanum, **F.C.C.**, 1947...391, 392, 393, 394, **395**, lxv
  × Yeoman, **A.M.** 1947, lxiii, 408
  yunnanense, lxv, 422
  Zuyder Zee var. Helen, lxv
Rhododendrons, 132, 136, 139, 140, 141, 142, 143
Rhodostachys andina, 227
  pitcairniifolia, 190, 226
Rhubarb, The Sutton, lxix
Rhus corriaria, **101**
Rhyncospermum jasminoides, 186
Ribes aureum, 340
  laurifolium, 4
  sanguineum, lx
  speciosa, 190
Ricinus, 193
Ridley, H. N. on The Scent of Mimulus moschatus, 373
Robinson, G. W. on Two Noteworthy Salvias, 249
    on Veronica Derwentia, 400
Rochea perfoliata, 187
Rochford, Mr. Bernard, **V.M.H.** 1946, **61**
"Rock Garden and Alpine Plants, The," by G. A. R. Phillips, reviewed, 457
Romneya Coulteri, 160, 423
"Root Vegetables," Bull. No. 120 Min. of Agric. reviewed, 336
Rosa, 306
  Banksiae, 236
  canina, 155
  × cantabrigiensis, lxxvi
  Ecae, **357**, 371, 372
  Hugonis, 129, 165, 371
  indica, lxxviii
  Moyesii, 231
  Primula, 129, 165, 371, 372
  rubrifolia, 107
  spinosissima, 165
  xanthina, 371, 372, 423
Roscoea procera, **A.M.** 1946...123
Rose Alain, lxxx
  Arthur J. Taylor, **A.M.** 1946, v, 123
  Barbara Richards, 397
  Baroness Rothschild, 156
  Betty Prior, 425
    Uprichard, 156
  Blush Rambler, 156
  Bouquet d'Or, 156
  Bridget, lxxv
  Canarybird, **A.M.** 1946, viii, 123
  Capt. Christy, 156
    Hayward, 156
  Charles Gregory, **A.M.** 1947, lxix, 408
  Chas. P. Kilham, 156
  Cherokee, 354
  Cheshunt Hybrid, 156
  Christine, 156
  Clara Watson, 156
  Crimson Glory, 396, 397
    Glow, **A.M.** 1947, lxxii, 455
  Dame Edith Helen, 397
  Dr. F. G. Chandler, 397, 398
  Donald Prior, 106
  D. T. Poulsen, 106
  Else Poulsen, 106
  Ena Harkness, **A.M.** 1946,...123
  Eternity, lxxxiii
  Fantasia, **A.M.** 1947, lxxv, 455
  Felicia, 425
  Félicité Perpétue, 156

Rose Fortune's Yellow, 372
  Frau Karl Druschki, 156
  G. A. Van Rossem, 397, 398
  G. Duisberg, 397
  Glorious, lxxv
  Golden Crest, **A.M.** 1946...160
  James Gibson, 397, 398
  Joanna Bridge, 156
  J. C. Thornton, 398
  Joseph Guy, 106
  Karen Poulsen, 106
  Katherine Pechtold, 396, 397
  Lady Sylvia, 397
    Trent, vii
    Waterlow, 156, 426
  La Follette, lxviii
  La Marne, 106
  Mabel Morse, 396
  McGredy's Gem, 397
    Ivory, 398
    Sunset, 397
    Triumph, 397
    Yellow, 156, 397
  Mme. A. Carrière, 156
    Pernet-Ducher, 156
  Marchioness of Londonderry, 156
  Maréchal Niel, 156
  Margaret Dickson, 156
  Marie van Houtte, 156
  Marion Cran, 397
  Merveille des Rouges, 106
  Michelle Meilland, lxxx
  Mrs. A. R. Barraclough, 396, 397
    Chas. Lamplough, 397
    John Laing, 156
    Paul, 156
    R. G. Sharman Crawford, 156
    Sam McGredy, 396, 397, 398
  Nur Mahal, 425
  Orleans Rose, 106
  Paul Neyron, 156
  Paul's Carmine Pillar, 156
  Peace, **A.M.** lxxxiii
  Phyllis Gold, 397, 398
  Portadown Sally, 396, 397
  Poulsen's Bedder, lxxv
    Yellow, 106
  President Chas Hain, 397
  Reine Olga de Wurtenburg, 156
  Rhodatte, 106
  Rouge Mallerin, 396
  R. S. Hudson, **A.M.** 1946, vii, 160
  Shot Silk, 156
  Sir Henry Seagrave, 398
  Southport, 396, 398
  Spek's Yellow, **A.M.** 1947, lxxv, 456
  Spitfire, lxix
  Suzanne-Marie Rodocanachi, 156
  Tea Rambler, 156
  The Doctor, 397
  Una, 156
  Victoria, **A.M.** 1947, lxxii, 456
  Wheatcroft's Golden Polyantha, vii
  William Allen Richardson, 156
  William Moore, 396, 397, 398
  Zephyrin Drouhin, 156
Royena lucida, 234
Rubus trilobus, **A.M.** 1947, lxiv, 408
Salix, 141, 168, 176
  v. britzensis, 468
  daphnoides, 468
  sp., lv
  vitellina pendula, 2, 380, 467
Salvia argentea, 185
  blepharophylla, 249
  caerulea, 340
  Grahamii, 229, 250, 251
  Horminum, 101
  judaica, 101
  microphylla, lxxxv
  neurepia, 250, 251
  Pittieri, 249, 250
  rutilans, 231
  salvifolia, 101
  sp., 223
Salvias, Two Noteworthy, 249
Sandeman, Christopher, on Gardening in Lima, 23
San, K. Wada, by G. Anley, 486
Sarcocca humilis, 48
Sargentodoxa cuneata, Botanical Certificate, 1947, lxiv, 408
"Saturday in my Garden," by F. Hadfield Farthing, reviewed, 412
Saxifraga cernua, 144
  Cherry Trees, 80
  Cotyledon, 215
  Cranborne, 80
  Diapensia, 170
  Fortunei, 417
  Grisebachii, 48
  Irvingii, 79
  Jenkinsii, 79
  Myra Cambria var., lviii
  oppositifolia, 80
  Peltata, 128
  Perle Rose, 80
  Primrose Bee, 80
  Riverslea, 80
Schima khasiana, **P.C.**, v
Schizocodon macrophyllus, 129
  soldanelloides, 129
    var. alpina, Cultural Commendation, lxvi
Schizophragma integrifolium, lxx
Schizostylis coccinea, 231, 380, 417
  coccineum, 185
Sciadopitys verticillata, 238, lxxi
Scilla amoena, lv
  bithynica, lv
  Hohenackeri, 487
  hyacinthoides, 70
  monophylla, **A.M.** lv, lvi
  peruviana, 185
  siberica, 48, 487
  Tubergeniana, 48
  verna, lv
Seaforthia elegans, 233
Secretary's Page, The, 1, 45, 77, 125, 161, 213, 257, 293, 337, 377, 413, 461
Sedum, 144
  crassipes, **142**
  pilosum, lxvi
  sp., 223
Selenicereus grandiflorus, **274**, 284

Selenipedium × grande, Cultural Commendation, lxi
Semele androgyna, 232
Sempervivum arachnoideum, 186
  tabulaeforme, 187
Senecio Doria, lxxvii
  grandifolius, 223, 231, 235
  Hectori, 191
  Kirkii, 191, 223
  laxifolius, 426
  mikanioides, 187
  perdicioides, 234
  vulgaris, 364
Sequoia sempervirens, 240
Serapias vomeracea, 70
"Shade and Ornamental Trees for South Florida and Cuba," by David Sturrock and Edwin A. Menninger, reviewed, 460
Sharman, B. C., on Short nights: an unappreciated hindrance to maize cultivation in England, 195
Shortia galacifolia, 129
  uniflora var. grandiflora, 129
Shrubs and Plants, Uncommon American, by Mrs. J. Norman Henry, 382
"Shrubs and Trees for Everyman's Garden," by G. R. Jackman and F. A. Bush, reviewed, 457
Silene virginica, 387, 388
  Wherryi, 388
    var. Alabama, 388
Sisyrinchium grandiflorum, 80
Sketch map of Eastern Himalaya, **176**
Skimmia japonica, 4
Smilacina racemosa, **A.M.** 1947, lxiv, 408
Smilax aspera, 101
Snowdrops at Dawyck, **8**
"Soil Fertility Renewal and Preservation," by E. Pfeiffer, reviewed, 411
Solanum, 24, 228
  (aviculare), 227
  crispum, 190
  pseudo-capsicum, 185
  Torreyi, lxxxv
  Wendlandii, 29, 216, 261
Solidago Goldenora, lxxvii
  Lemocreme, lxxx
  Lena, selected for trial, lxxiii
  Lennie, lxxx
  Leon, lxxx
  Leonora, lxxvii
  Leonard, selected for trial, lxxxiii
  Lesden, selected for trial, lxxxiii
  Lesfield, lxxx
"Some Properties and Application of D.D.T." Min. of Supply Bull. 1946, reviewed, 44
Some Wild Plants of Palestine, by Dr. Elisabeth Boyko, 68
Sophora microphylla, 233
  Moorcroftiana, 134
  tetraptera, **234**
Sophronitis grandiflora, 87
Sorbus, 9, 176, 380
  pohuashanensis, **A.M.** 1946, iii, 211
Sparmannia, 234
  africana, 182, 185, 187, 189, 224
Spartium junceum, 25, 216, 426
Sphaeralcea Fendleri, 341
Spinach Advance, **A.M.*** 1946...210
  Giant-Leaved Prickly, **A.M.*** 1946, 211
  Norman Cobea, **A.M.*** 1946...210
  Reliance, **A.M.*** 1946...210
  Standwell, 211
    Round, 210
  at Wisley, 1946...210
Spiraea, 172
  Anthony Waterer, 260, 297
  arborea, 297
  arcuata, 134
  Billardii, 297
  bumalda, 260
  japonica var. Anthony Waterer, 107
Sprekelia formosissima, 29
Spruce, Brewer's, 1946...**22**
Spruneriana, 16
Stachys grandiflora, **A.M.** 1946...160, lxx
  palestina, 101
Stachyurus praecox, 47
Stachelina Lobelii, 14
Staphylea Coulombieri grandiflora, lxiv
Statice sp., 223
Stellera Chamaejasme, 174
Stenoglottis longifolia, 87
Stearn, W. T. on Allium tricoccum, 36
Stearn, W. T., and E. A. Bowles on The History of Anemone japonica, Part I, 261; Part II, 297
Stephenson Joseph W., on Arbutus Menziesii in its native habitat, 160
Stern, Col. F. C. on Cornus Kousa var. chinensis, **357**, 371
  on The Tibetan form of Paeonia lutea, 394, 395
Sternbergia aurantiaca, 70
  colchiciflora, 70
  lutea, 380
  macrantha, 70
Stewartia ovata, 388, **394**
Stokesia cyanea, 458
Stonor, C. R. on Cypripedium hirsutissimum as an epiphyte, 73
Strawberries, 96, 98
"Strawberries," Bull. No. 95, Min. of Agric. reviewed, 459
Strawberry Auchencruive Climax, lxix
  Early Cambridge, lxix
  Icetone, lxxii
  Nell Gwynne, lxxii
  Royal Sovereign, 99
  Seedling, lxix, lxxii
Strelitzia, 236
  Augusta, 230
  parvifolia, 230
  Reginae, 29, 230
Streptocarpus Constant Nymph, Cultural Commendation, selected for trial, lx
  Dunnii, Silver Lindley Medal, lxxii
Streptopus simplex, 135, 172
Styrax americanus, 385
  grandifolius, 386
  japonica, 164, 216, 234, 425
  officinalis, 101

"Suppression of weeds by Fertilizers and Chemicals," by H. C. Long and W. E. Brenchley, reviewed, 410
Swainsonia, 186, 231
Swarbrick, Thomas, on Growth Regulating substances in horticulture, 313, 1946...342
Sweet Pea Clare Luce Booth, **A.M.** 255
  Cynthia Davis, **F.C.C** 1946...255
  Fairy Princess **A.M.** 1946...255
  Fire King, **A.M.** 1946...255
  Gaiety, **F.C.C.** 1946...255
Sweet Pea Ida, **A.M.** 1946...255
  Mabel Gower, **A.M.** 1946...255
  Pink Beauty, **A.M.** 1946...255
  Scarlet O'Hara, **A.M.** 1946...255
Sweet Peas, 2, 96, 198
Swertia multicaulis, 173
Syringa Kathleen Havemeyer, 165
  Macrostachya, 165
  Marechal Foch, 165

Taiwaina cryptomerioides, 240
Taxodium ascendens var. nutans, 238
  distichum, 240
Taxus vaccata var. fastigiata, 109
Taylor George, on Plant Collecting in South-Eastern Tibet, 130, 166
  George on Meconopsis from the vicinity of Lhasa, 309
Tetranthera (= Litsea) japonica, 184
Teucrium, 231
  fruticans, 188
Thalictrum Chelidonii, lxxiii
  diffusiflorum, **A.M.**, lxxxiii
  kiusianum, 296
"The A.B.C. of Vegetable Gardening," by W. E. Shewell-Cooper, reviewed, 410
"The Detection and Control of Garden Pests," by G. Fox-Wilson, reviewed, 409
"The Earth's Green Carpet," by Louise E. Howard, reviewed, 376
Thermopsis barbata, 174
Theropogon pallidus, 259
Thomas, I., on Injury to Aster Seed, by the leaf-curling plum aphis, 369
Thornton, Dr. and the New Illustration (1799–1807), by F. M. G. Cardew, 281
  Royal Botanical Lottery, 450
Thornton, Robert John, M.D., **274**
Thrips tabaci, 370
Thuja dolabrata variegata, 239
  orientalis var. ericoides, 238
    var. semperaurescens, 238
Thunbergia alata, 28
  grandiflora, 28
Thuya occidentalis lutea, 238
  orientalis, 109, 238
  plicata, 7, 109
Thymbra spicata, 101, 103
Thymus capitatus, 103
  integer, **A.M.** 1947, lxvi, 488
Tibouchina semidecandra, 81, 341, 381, [416
Tilia euchlora, 108
  tomentosa, 108
Tomato, 96, 98
  Harbinger, 98
  Hundredfold, 98, 101
  Plumpton King, 98
  Stonor's Money maker, 98
  The Summit, recommended for trial, lxvi
Trachelium tubulosum, 14
Tradescantia graminea, 389
  virginiana, 188
"Trees for Town and Country," by Brenda Colvin and Jaqueline Tyrwhitt, reviewed, 456
Tresco under three reigns, by the Rt. Rev. J. W. Hunkin, 177, 221
Tricuspidaria lanceolata, 26, 35
Trillium Catesbaei, 385
  erectum, 385, **394**
  grandiflorum, fl. pl. 385, **394**
  nivale, 385
  ovatum, 385
Tristania, 236
  conferta, 234
Trochocarpa thymifolia var. disticha, lxvi
Tropaeolum speciosum, 26, 251, 296, [425
Tsuga Albertiana, 239, 240
  canadensis, 7
    pendula, 238
  dumosa, 176
  heterophylla, 7
  Martensiana glauca, 239
Tulbaghia pulchella, 416
Tulip Bakeri, 15, 16, **22**
  Black Parrot, lxv
  Firebird, lxv
  Gadelan, lxv
  hybrid Edwin Fischer, selected for trial, lvii
    Fritz Kreisler, selected for trial, lvii
    Robert Schumann, selected for trial, lvii
    Vivaldi, selected for trial, lvii
  Mendelssohn, lvii
  Orange Parrot, lxv
  Papago, **P.C.**, lxv
  Smiling Queen, **A.M.** 1947, lxv, 408
  Sparkling Eye, **A.M.** 1947, lvii, 374
  Sunshine, lxv
  Sweet Harmony, **P.C.**, lxv
  Szweelinck, lvii
Tulipa cypria growing through Poterium spinosum, 16, **23**
  Eichleri, 30
  Gregii, 30
  linifolia, **A.M.**, 1947, lxv, 408
  montana, 251
  oculus solis, 70
  polychroma, 48
  praecox, 70
  saxatilis, 15, 29, 30
  sharonensis, 70
Tulips, a group of, **274**
Turnip, 96, 97
  Early White Milan, 97
  Seven Tops, lxvii
  Shoigoin, lxvii
Two Colours, by P. H. Davis, 487

Ulmus campestris, 457
  stricta Wheatleyi, 457

Vaccinium, 176, 340
  modestum, 137
  pennsylvanicum, 389
Validallium tricoccum, 36
Vallota purpurea, 341
Vanda Amesiana, 87
  coerulea, 74
  Kimballiana, 87
Veratrum album, lxxiv, lxxviii
Verbascum paniculatum, 260
  phoeniceum Mother of Pearl, lxviii
  spinosum, 259
Verbena chamaedryfolia, 216
  venosa, 364
Veronica Andersonii, 180
  arborea, 234
  carnosula, 236
  Derwentia, 400
  Dorrien-Smith, 231
  elliptica, 190
  labiata, 401
  Lewisii, 231
  macrocarpa, 232
  Pageana, **P.C.** lxvi
  sp., 223
  vernicosa, 236
Viburnum alnifolium, lx
  bitchiuense, 361
  Burkwoodii, 361
  Carlcephalum, **356**, 361
  Carlesii, **356**, 361, 422
  Davidii, **356**, 363, lxxxiv
  fragrans, 3, 48, **356**, 360, 416, 467
  Henryi, 363
  koreanum, lxxxiv
  Lantana, 363
  macrocephalum, 361, 362
    var. grandiflorum, **356**, 362
  Opulus, 362
    fructo-lutea, 362
    sterile, 362
  Park Farm Hybrid, 361
  rhytidophyllum, 363
    roseum, 356
  rugosum, 190
  Sandankwa, 185
  The Genus, by A. Burkwood, 360
Viburnum Tinus (Laurustinus), 360
  tomentosum, 363
    var. Mariesii, 424, **436**
  plicatum, 362, 423
      grandiflorum, 363
    Rowallane, var. 357
Viburnums, 341
Viola Iden Queen, lxiv
Violets, 96
Vitex Agnus-castus, 29, 100, 103
  littoralis, 188, 231

Walnuts in England, Some preliminary investigations on the growing of, (1925–46), by E. M. Glenn, R. [illegible] Hatton and A. W. Witt, 269
Warlencourt, France, **100**
Warne, L. G. G., on Bud and Fl[illegible] dropping in Lupins, 193
Watsonia Galpinii, 225
  stenosphon, lxviii
Weiss, Prof. F. E., **V.M.H.** 1946...**61**
West, Dr. Cyril, on When and How the Amateur should pick and store apples and pears, 49
Westringia rosmariniformis, 184
Wilson, G. Fox on Chrysanthemum Eelworm and its control, 364
  on The leaf-rolling Rose saw-fly, Blennocampa Pusilla, 155
Wisley Gardens, 2, 17, 79, 127, 163, 214, 259, 295, 339, 379, 415, 467
  Storm over, 483
  The Pond in Seven Acres, **8**
  trials, 1946...36, 113, 202
Wood, W. P., on Fuchsias, 438
Woodwardia, 235

Xerophyllum tenax, 11

" Year Book for Mushroom Growers," 1946, reviewed, 460
Yucca aloifolia, 235

Zauschneria mexicana, 296
Zinnia, 96

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